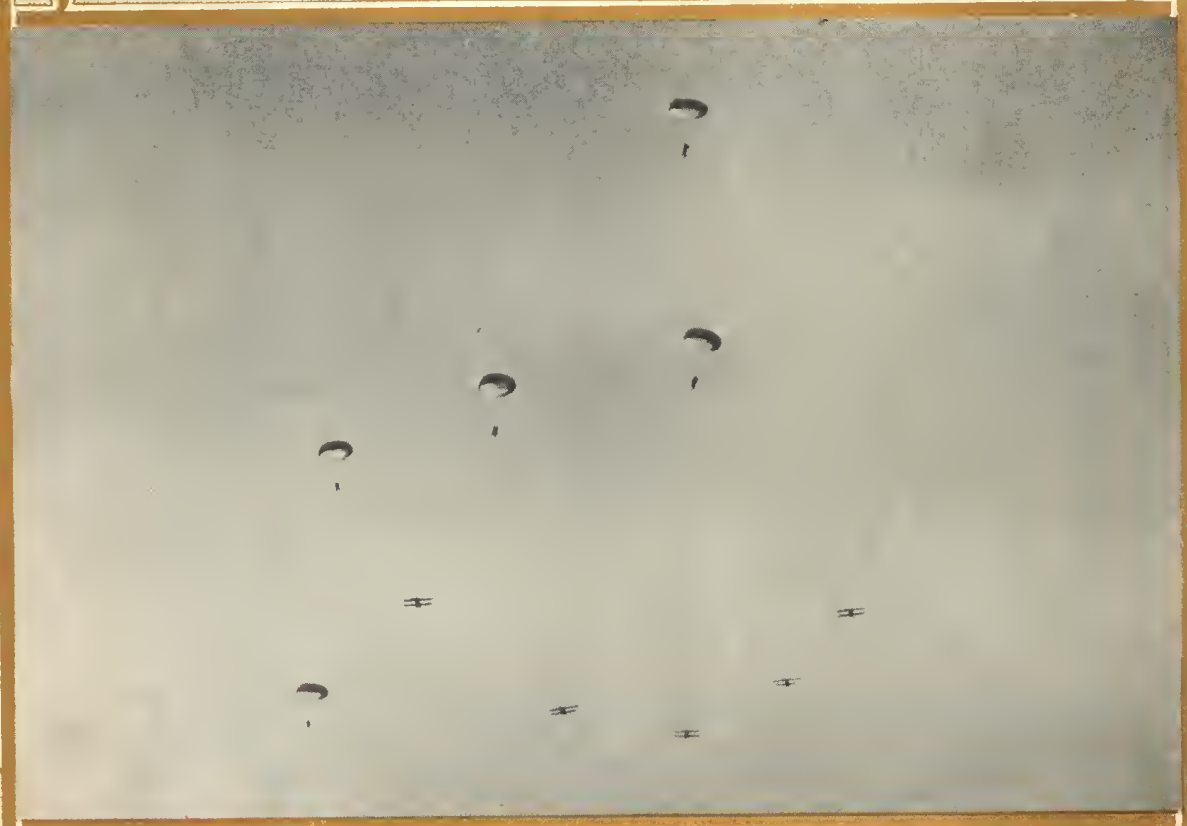
AVIATION

The Oldest American Aeronautical Magazine

JANUARY 5, 1929 Issued Weekly PRICE 20 CENTS



Five jumpers with Russell 'chutes in mid air just after leaving formation

VOLUME XXVI

NUMBER 1

Special Features

Selling the Airplane Market in 1929

The Industry's Progress During 1928

A Review of Design Development in 1928

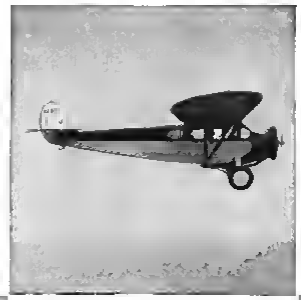
AVIATION PUBLISHING CORPORATION
250 WEST 57TH STREET, NEW YORK

Entered as second class matter July 27, 1928, at the post office at New York, N. Y., under the act of March 5, 1879. Yearly subscription rates: Domestic, $4; Canada, $5. All other countries, $6.

NEW PLANES OF PROVEN DESIGN. NEW PROFIT POSSIBILITIES. At the Chicago Show, you saw the planes. And you heard about our dealer proposition . . . a plan which aroused genuine enthusiasm. The busiest flying season is only four months ahead, but prompt deliveries are assured to dealers who place their orders *now.* Write or telegraph Fairchild Airplane Manufacturing Corporation, Farmingdale, Long Island, New York.

THE 21

(Below) 2 passenger, low wing monoplane, tandem cockpit, especially designed for training Dual control. 80 h. p. Genet engine. The eight foot tread of landing wheels is 30% of wing span. Oleo shock absorbers with ten-inch travel on landing wheels. Tail wheel with oleo shock absorber. Landing speed 40 m. p. h. No floating, no bouncing And Fairchild brakes High speed 105 m. p. h Disposable load 495 lbs. . . . . **Price $4,250, fly away Farmingdale.**



THE 41

(Below) 4 passenger, high wing cabin monoplane. Wright "Whirlwind" 200 h. p. engine. Wings fold in two minutes. Tail wheel. Shock absorbers on all wheels. Brakes. Dual control. Floats or skis installed in two hours. Fine interior finish. Sound proofing. Spring cushions. Non shattering glass Exhaust silencer. Heater Disposable load 1220 lbs. High speed 130 m. p. h. Cruising range 500 miles . . . **Price $8,950, fly away Farmingdale.**

THE 71

(Above) 7 passenger cabin monoplane. This is the tried and proven Fairchild "Wasp" with many refinements. Largest passenger and cargo capacity (145 cu. ft.) of any 410 h. p. plane of its speed. Folding wings. Change to floats or skis in two hours. Fine interior finish. Sound proofing. Spring cushions. Non-shattering glass. Exhaust silencer. Heater. Disposable load 2715 lbs. High speed 136 m. p. h. Cruising range 900 miles . . . **Price $18,900, fly away Farmingdale.**

FAIRCHILD

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Whatever your problem, bring it to Goodyear. If you need data on Goodyear Airplane Tires, we have it. Or if you want to know if some part, or item of equipment can be fashioned from, or made better, by rubber, ask Goodyear.

Any question will get prompt, sympathetic attention and understanding. Write, wire or telephone.

Aeronautics Department
THE GOODYEAR TIRE & RUBBER COMPANY, INC.
AKRON, OHIO

EVERYTHING IN RUBBER FOR THE AIRPLANE

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Master Rod
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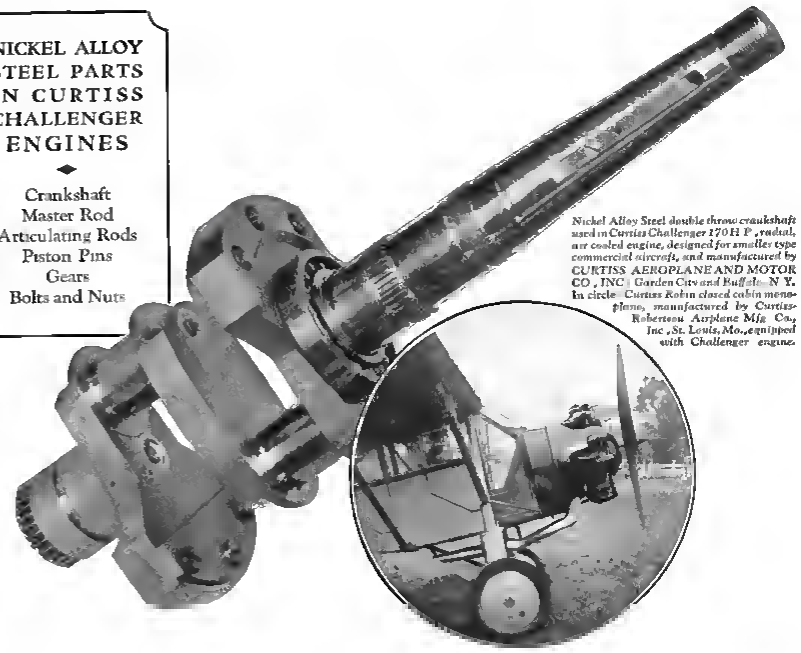
Bolts and Nuts



Nickel Alloy Steel double throw crankshaft used in Curtiss Challenger 170 H P., radial, air cooled engine, designed for smaller type commercial aircraft, and manufactured by CURTISS AEROPLANE AND MOTOR CO., INC., Garden City and Buffalo, N Y. In circle Curtiss Robin closed cabin monoplane, manufactured by Curtiss-Robertson Airplane Mfg. Co., Inc., St. Louis, Mo., equipped with Challenger engine.

Nickel Alloy Steel Parts in the new

CURTISS CHALLENGER ENGINES

Insure dependable strength without excessive weight

A NEW Curtiss Challenger engine was recently tested on the block in three fifty-hour runs. The same engine was then installed in a Curtiss Robin monoplane, flight-tested for 100 hours and then flown from Curtiss Field to Los Angeles and back — 6000 miles — averaging 100 miles per hour with gasoline consumption of 11¼ miles to the gallon. After these severe tests, totaling 310 hours, the engine was returned to the factory and disassembled where every part was examined with precision instruments and found to be in beautiful condition.

This remarkable performance record of the Curtiss Challenger justified without question the confidence Curtiss engineers placed in the Nickel Alloy Steel parts used so extensively in this new engine.

Nickel
FOR ALLOY STEEL

The performance records of the Nickel Alloy Steel parts used by leading manufacturers of aeroplane engines are conclusive evidence of the dependability of these Alloys. The experience of typical users has contributed to an extensive fund of valuable technical data. You are invited to consult our engineers and thus draw upon this information.

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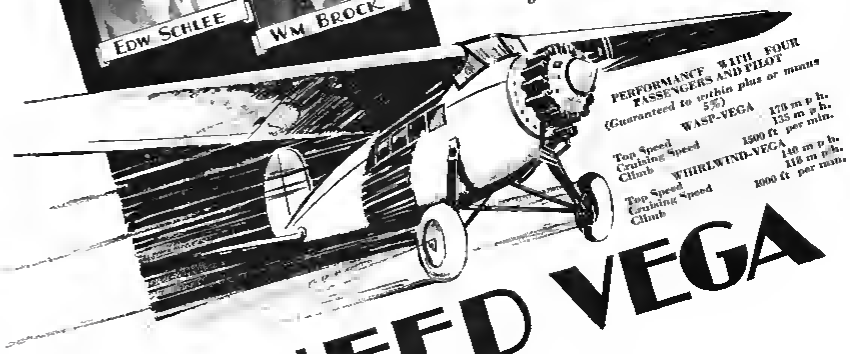

PERFORMANCE WITH FOUR PASSENGERS AND PILOT
(Guaranteed to within plus or minus 5%)

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Top Speed 170 m p h.
Cruising Speed 135 m p h.
Climb 1500 ft per min.

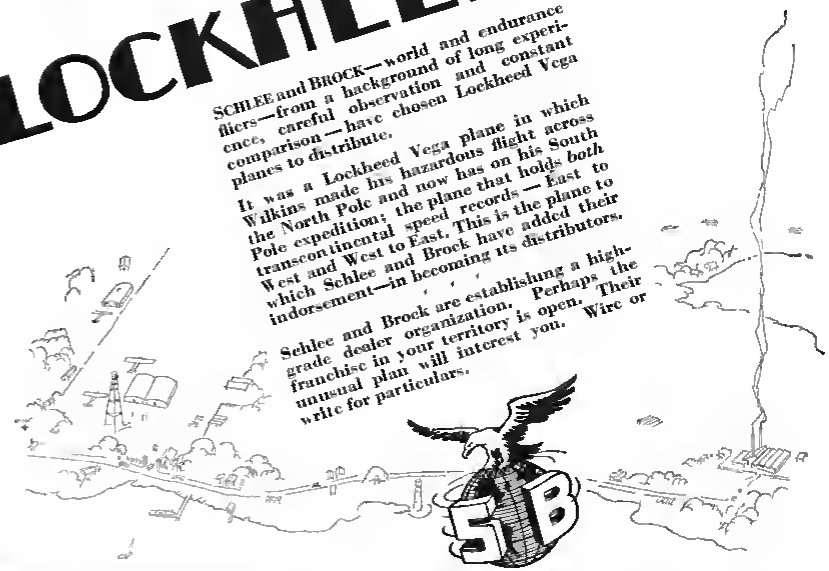
WHIRLWIND-VEGA
Top Speed 140 m p h.
Cruising Speed 118 m p h.
Climb 1000 ft per min.

LOCKHEED VEGA

SCHLEE and BROCK—world and endurance fliers—from a background of long experience, careful observation and constant comparison—have chosen Lockheed Vega planes to distribute.

It was a Lockheed Vega plane in which Wilkins made his hazardous flight across the North Pole and now has on his South Pole expedition; the plane that holds *both* transcontinental speed records—East to West and West to East. This is the plane to which Schlee and Brock have added their indorsement—in becoming its distributors.

Schlee and Brock are establishing a high-grade dealer organization. Perhaps the franchise in your territory is open. Their unusual plan will interest you. Wire or write for particulars.



SCHLEE-BROCK AIRCRAFT CORPORATION ★ ★ 2008 FISHER BUILDING ★ ★ DETROIT

An Event Well Worth Celebrating

Aviation has traveled far since that first twelve seconds flight of December 14th, 1903. One trip through the recent International Aeronautical Exposition demonstrated this.

Tiny planes, as efficient and graceful looking as a racy roadster, giant planes that rival the pullman car in appointments, express planes, passenger planes and pleasure planes—the huge floor space of the Coliseum was filled with them. Instruments and auxiliaries, undreamed of a few years ago, were shown in countless numbers.

In this great development of aviation, fuel and lubrication have necessarily been important factors. Safe, economical air service requires a high standard aviation gasoline and aero oil. Special fuels and lubricants had to be developed.

Early in the history of flying, the Standard Oil Company (Indiana) began the development of special gasolines and oils for airplane service. The result was — Stanolind Aviation Gasoline, Stanolind Aero Oil and Superla Aero Oils. Today these products are the choice of the majority of pilots throughout the middle west.

At almost every flying field in the midwestern states you can obtain Stanolind and Superla Aero products.

Our New Aviation Manual discusses authoritatively and impartially airplane motors, aero gasoline and oil. It lists airports and landing fields throughout the middle west. It gives other valuable information to aviators. Write for your copy.

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308

When the World's Crack Trains are too Slow!

Northwest Airways, Incorporated, in connection with three of the great western railroads, have selected Pratt & Whitney powered equipment to carry on the first air-rail route.

By the use of Ford tri-motor and Hamilton single-engine planes, now in daily operation between Chicago and St. Paul and Minneapolis, a full business day is saved the traveller on his trip to the East or West Coast.

Passengers have the assurance on this line that the Pratt & Whitney engines behind which they ride embody the finest in modern design and workmanship — engines with an international reputation for dependability.

THE PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

HERE
we shall go on building good ships

It is called the new Mahoney-Ryan factory We think of it as a pledge given permanent form in masonry and steel It is a mile-stone in the march of a young industry now coming of age.

This modern, daylight plant adjoins Lambert Field, the great airport of St Louis, Missouri. The site covers nine acres Provides every known facility for the production of trustworthy ships.

And now in quantity production is the new Mahoney-Ryan Brougham, which will carry six in comfort and security when powered by the Wright Whirlwind J-6 engine, 300 horsepower, or five with the J-5 Whirlwind

Built into this ship are the engineering principles proved sound in the world's greatest endurance flights In cabin refinements, it approximates the luxury of a high class motor car. It delivers ten miles to the gallon of gasoline and its safe cruising radius is eight hundred miles

The Mahoney-Ryan Brougham takes off faster and lands slower, with its full load, than any other plane of its type. It is the only plane of its type with a service ceiling of over 16,000 feet It is the only plane powered with one engine that has lifted a useful load of 2,500 pounds from a field 7,600 feet above sea level.

These facts have been demonstrated in open competition, they are beyond dispute Because of these facts, the Mahoney-Ryan Aircraft Corporation builds and sells more Whirlwind cabin monoplanes than any other maker This volume makes possible the attractive price

Send for descriptive booklet, fully illustrated, which is gladly forwarded upon request.

AFTER completing his New York to Paris flight, Col Lindbergh said "I had what I regarded and still regard as the best existing plane to make the flight." The Mahoney Ryan Brougham is a Sister Ship further developed and refined, adapted to the most searching demands of commercial air travel or personal use ***U S Department of Commerce Approved Type Certificate No. 25***

Present representation includes these leading distributors:

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Rapid Air-Lines, Inc. *Rapid City, S. Dak*
Scenic Airways Inc *Phoenix & Grand Canyon, Ariz*
Mission Airplane Services *San Antonio, Tex*
Dixie Aviation Company *Fort Worth, Tex*
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Aircolo, Limited *Sidney, Australia*

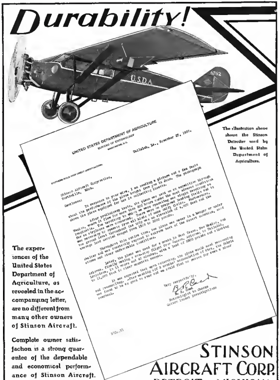
In territory not yet taken up we offer an attractive proposition to distributors qualified to handle the line Correspondence invited

The MAHONEY — RYAN AIRCRAFT CORP'N

Anglum (St. Louis County) Missouri

Owners of Ryan Air Lines **San Diego, Cal.** and Ryan Flying Company **St. Louis, Mo.**

Durability!



The illustration above shows the Stinson Detroiter used by the United States Department of Agriculture.

The experiences of the United States Department of Agriculture, as revealed in the accompanying letter, are no different from many other owners of Stinson Aircraft.

Complete owner satisfaction is a strong guarantee of the dependable and economical performance of Stinson Aircraft.

STINSON AIRCRAFT CORP.
DETROIT MICHIGAN

"Build Us an Outstanding Small Cabin Biplane!"

—and Paramount Has Answered with Enviable Success

IN the first place, Cabinaire has performance second to none carrying the same amount of power. Second: Cabinaire has a dependable power plant. It is the first plane to be designed around the Warner Scarab 110-H.P. motor. Third: Cabinaire has greater visibility than any other cabin job; an ever-increasing and important feature. Fourth: Cabinaire has a sturdy under-carriage; equipped with Aerol struts and Bendix self-energizing waterproof brakes. Fifth: Cabinaire has comfort, plenty of leg room, head room, and ample baggage accommodation. Cabinaire has color, dash, style, and is credited with being the most beautifully finished ship at the recent Chicago show.

The Paramount Aircraft Corporation is not a new company. It is not a company without experience in aircraft manufacture. For over a year experiments and test work have been going on, and production has been established on a definite basis for over 5 months. In Cabinaire is embodied the recommendation, ideas, and experience of men who have been doing day-in-and-day-out flying for the past 16 years. The heads of our various departments have been associated with the designing and flying of aircraft during the war and prior to it. As a result of this, every Cabinaire plane turned out measures up to the highest standards of rigidness, safety, efficiency, stability, low operating cost and enviable performance.

These requirements as well as numerous others, have, after 14 months of design and 5 months of production, been achieved only in Cabinaire. Price, $7,200.00, which includes cabin heater, exhaust ring, windshield wiper, rugs, upholstered wicket chairs, nickel door trim and controls, Standard Steel prop, Consolidated control panel, etc. We are now in position to make immediate delivery in lots of from one to five.

SPECIFICATIONS
CABINAIRE 4-PLACE CABIN BIPLANE

Dimensions

Span Upper Wing	34 ft 5 in
Span Lower Wing	29 ft.
Total Wing Area (including Ailerons)	322 ft
Height	9 ft
Length	23 ft 5 in
Wheel Tread	7 ft 6 in.

Capacity and Useful Load

Seats pilot and three passengers and baggage	Normal pay-load, 500 lbs.
Weight empty	1300 lbs.
Total weight loaded	2200 lbs

Fuel Capacity Data

Gasoline (2 tanks in upper wings, 21 gals each)	42 gals
Oil	4 gals

Performance

High speed (sea level)	103 M.P.H.
Stalling speed	38 M.P.H.
Cruising speed	90 M.P.H.
Rate of climb at sea level (feet per min.)	750 ft.
Service ceiling	12,000 ft
Cruising range	465 mi

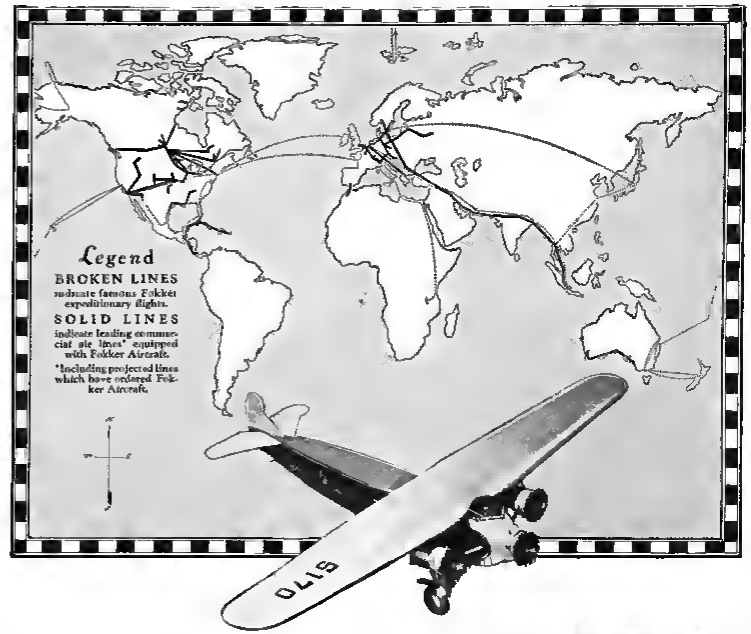
We have a profitable distributors' franchise open in several good territories. If interested, write for full detailed facts and figures.

Approved Type Certificate

Request for approved type certificate from the Department of Commerce was made October 25, 1928. Receipt of this certificate is expected shortly

CABINAIRE

Paramount Aircraft Corporation — Dept. A-1 — **Saginaw, Michigan**



Worldwide Experience

A glance at the map shows the unsurpassed success of Fokker Aircraft. It confirms the Fokker title to first place. And it proves the statement often made by Fokker owners—that *when you buy a Fokker you buy the result of the widest experience.*

The famous Fokker long distance flights form a continuous path encircling the globe. Fokker-equipped commercial airways cover the principal continents now served by mail and transport lines. Add to this the vast sum of Fokker mileage, in the military services of many nations, on the daily flights of privately-owned Fokker airplanes used for touring, air-yachting, and the swift, safe transportation of personnel and materials for large industrial owners.

Here stand the direct results of 18 years' comprehensive designing, flying and manufacturing experience. Into every Fokker bought today are built the proved and tried principles, the practical knowledge of materials, production methods and design, which have established the world-wide record of Fokker performance. All the reliability and economy assured by Fokker history, we now offer in the *first complete line of quality aircraft*, ranging from the single-engined cabin types, to the largest and most powerful airliners, all constructed to definite specifications and factory-equipped with every requisite for efficient air transportation.

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factories: Wheeling, W. Va., and Teterboro Airport, Hasbrouck Heights, N. J.

Address Inquiries: NEW YORK OFFICE, 110 East 42nd Street

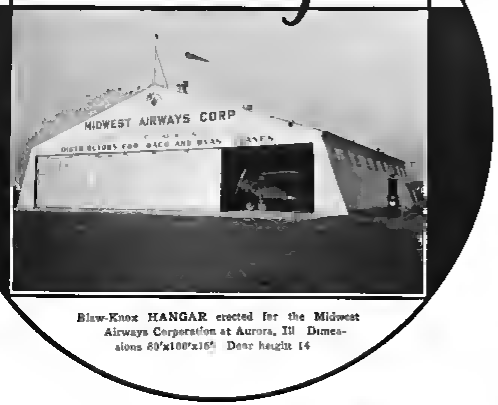
WHAT KIND OF HANGAR SHALL WE ERECT?

That's the question

IT should be firesafe but we don't want to make a big investment . . . we might move . . . we want something that can be enlarged if we need more space, etc., etc.

HERE'S THE ANSWER TO THESE QUESTIONS

Firesafe



Blaw-Knox HANGAR erected for the Midwest Airways Corporation at Aurora, Ill Dimensions 80'x100'x16' Door height 14

BLAW-KNOX STEEL HANGARS

There's no lingering doubt in your mind when you decide on a Blaw-Knox HANGAR—You know you can enlarge it or move it to a new location—you know it will cost little to maintain because it is made of copper-bearing, galvanized steel and offers the utmost resistance to weather and corrosion. It solves all hangar problems of the present and anticipates the future. It is both permanent and portable and does not commit you to a vast investment which you may have to abandon without salvage. Ask our nearest district office for complete data.

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THE GOGGLES THAT KEEP YOU WARM

WARMTH—Comfort—Safety—Combined in the popular Lamoglas "39" pictured above. Triple chenille binding, safe non-scatterable lenses, $6.00.

Lamoglas "36". Same as No. 39 but with double chenille binding. $5.00.

"Jack Frost" Navigator—same as the famous Lamoglas Navigator goggle—but with chamois lined sponge rubber mask extending to tip of nose. The newest safety goggle for winter flying. Per pair $10.00.

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Write for complete catalog. Send check with mail orders

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NEW YORK

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On the Stubble Fields *of the* Nation

Goodrich has helped *write the* History *of* Flying

TWENTY FIVE YEARS AGO, on the sandy slopes of Kill Devil Hill, two brothers wrote the first proof that man could ride the winds in a device that was heavier than air. Three years later, on the stubble fields of Western Ohio, they wrote history again . . . this time the first chapter of a chronicle that has not yet reached its climax.

Flimsy things of canvas and spruce, these first planes slid to earth on skids rather than wheels When wheels were added, they were bicycle wheels with bicycle tires . . . .

But soon after, even before the airplane had struggled out of its first crude form, Goodrich made its first real airplane tire. And ever since—over the battlefields of France, through night and fog with the Air Mail, over sea and land with Lindbergh, Kingsford-Smith, Byrd — Goodrich has gone where aviation has gone . . . progressing as flying has progressed . . adding its share to the effort of those thousands who are so intent on complete victory in man's battle for wings

Goodrich has staked out its field in aviation The realm of the heavier-than-air craft is its zone of endeavor. There Goodrich has pioneered . . . there Goodrich has helped write history. And there Goodrich still leads, with products as far advanced over its first efforts as the modern flying field is advanced over the fair ground landing lots of two decades ago.

The earliest airplanes slid to earth in almost any stubble field they could find . . .

Today's ships alight on fields as carefully tended as a putting green, with Goodrich tires to help cushion the shock

THE B. F. GOODRICH RUBBER COMPANY, Akron, Ohio

Established 1870

Pacific-Goodrich Rubber Company, Los Angeles, Calif.

In Canada Canadian Goodrich Company, Kitchener, Ont.

Goodrich *Rubber for Airplanes*

THANK YOU *for mentioning* AVIATION

ROBERTSON HAS THE EXPERIENCE

IN AIRPORT CONSTRUCTION . . . . . THERE CAN BE NO SUBSTITUTE FOR EXPERIENCE

Consider what experience means in this field.

In the building of airports, the construction business is afloat on strange, uncharted seas. A thousand new questions to answer. How can rust be prevented? What will a hangar cost? How can you secure a permanent structure that can still be moved to some other part of a field? How can you get inside daylight for mechanics to work in? These and a thousand other questions.

In this field, you cannot go to the textbooks with your problems; there has not been time for textbooks. The only rules are those of experience. The only men who know what to do about the problems are the men who have had actual experience in handling them.

For almost a dozen years, Robertson engineers have been working with these very problems. Helping to build hangars for the army, the navy, the marine corps; for city airports and for private flying fields. Since away back in the days when aviation was largely a military weapon and the Robertson Company was helping build military hangars near the French battlefields.

Today, you find construction companies that are old and wise in other fields of building coming to the Robertson engineers for advice about this special new field. Bring your problems to Robertson engineers. They will study your situation in the light of their experience and advise you, without cost and without obligation. Just write what you want to know.

H. H. ROBERTSON COMPANY · PITTSBURGH

One of the many hangars with roofs and sidewalls of R P M at Mitchell Field, New York.

ROBERTSON *has the Experience*

THANK YOU *for mentioning* AVIATION

At The Chicago Show

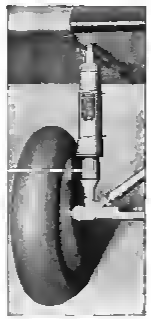
Oleo-Pneumatic Landing Struts Led All Other Designs of Shock Absorbers

At the International Aeronautical Exposition held at Chicago last December, more ships were equipped with Oleo-Pneumatic Landing Struts than any other design of shock absorber.

All types of ships from the nimble Pitcairn to the heavy Loening Amphibian displayed the little sign, "Equipped with Aerol Shock Absorbing Struts."

This acceptance of Aerol Struts is a natural recognition on the part of pilots, operators and manufacturers of the unequaled efficiency of the air-and-oil principle of shock absorption. No other principle effectively eliminates both the initial and secondary landing impacts because air (and air only) remains flexible when compressed.

The year of 1929 will see many more aircraft manufacturers joining the prominent group who have standardized on Aerol Struts. The cooperation of our engineers is at the disposal of all manufacturers.



Installation Diagram
This view shows how Aerol Struts are installed between the fuselage and wheels. "A" is the stationary cylinder. "B" is the telescoping cylinder attached to the axle allowing perfect freedom of movement, yet effectively eliminating destructive shock before it reaches the fuselage

THE CLEVELAND PNEUMATIC TOOL COMPANY, CLEVELAND, OHIO

Also manufacturers of Cleco-Gruss and Cleco-Westinghouse Air Springs for buses, trucks and automobiles

AEROL *shock absorbing* STRUT

AVIATION

The Oldest American Aeronautical Magazine

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Publication Office, New York, New York

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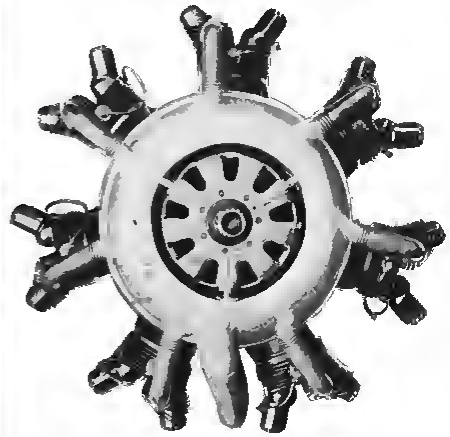
Enclosed find check ( ) money order ( ) for $

WRIGHT "WHIRLWIND"
7 CYLINDER 225 H.P.



The 5, 7 and 9 cylinder engines, comprising the new Wright "Whirlwind" series are equipped with

SCINTILLA

Aircraft Magnetos

SCINTILLA MAGNETO CO., INC.
SIDNEY, NEW YORK
Contractors to the U. S. Army and Navy

AVIATION

The Oldest American Aeronautical Magazine

Vol. XXVI JANUARY 5, 1929 No. 1

Happy New Year

THE year of 1928 has been one of progress and prosperity for the aeronautical industry, and there is every reason to believe that 1929 will equal it. Prosperity for the industry does not, however, necessarily mean prosperity for all of the individuals within the industry, and it is to the individuals in particular that AVIATION wishes a happy and prosperous New Year. The industry, after all, will grow and expand in accordance with the amount of effort and intelligence which is put into it by individuals.

The industry last year presented a most curious anomaly from the standpoint of personnel. Countless men, both young and old, felt that aeronautics was the coming industry and they made every effort to form a direct connection. There were, probably, ten applicants for every job available. Yet at the same time, those engaged in aviation, in either executive or in manual positions did double duty. Those in managerial positions worked for such long hours and so intensively that they were not nearly as efficient as they should have been. They were so tied up in detail that they did not have the time to ponder the broader problems of the industry or even their own business.

This apparently contradictory situation is explained by the lack of experienced and trained personnel. It is often easier to do the work one's self than to try and teach another how to do it. Aeronautics needs above all else, men who are competent to carry out specific jobs. It is AVIATION'S New Year wish that every man find the job in the industry for which he is best fitted, and that every company finds the personnel which it needs.

The Cost of Training

TODAY thousands of would-be pilots are regarding the aeronautic industry with longing eyes and slim pocketbooks. The cry that one hears from far and wide is, that the cost is prohibitive. At first glance it would seem so, but when one considers it in a somewhat different light the cost of becoming a licensed transport pilot is not so exorbitantly high as the newcomer claims it to be.

In the first place, piloting is not only a lucrative profession for those who are qualified, but it is a profession that requires that one possess a specialized education. And to obtain that education one must spend a certain amount of time in study and the practical application of the knowledge that he acquires. If one desires to derive a livelihood as an engineer he must first spend at least four years in college before he can take his place in the working field. And so it is with many other professions. They all take time in preparation.

Why should the art of piloting be the exception? In fact it should be even more the other way. The majority of specialized professions require at least four years training, most of which is in theory only, and then the person must accept small remuneration during the initial stages of practical application. Whereas, in the case of a transport pilot, around two years is the training period, which incidentally covers not theory alone but practical application, and the remuneration to be commanded "in the field" is perhaps double that of any other profession.

Thousands and thousands of young men have worked their way through colleges and other institutions of learning. There is no reason why the transport pilot student cannot do the same thing, or at least earn a part of his tuition outside of his regular tasks.

It is true that the cost of qualifying for a transport pilot's license is a bit high, but it will ultimately be decreased when factory production reduces the cost of planes to the school operator, and his own production of graduated students permits a decrease in the operating expenses. However, it should be realized that flying is a specialized profession that requires time in training, but which pays better "at the start" than any other profession.

Open Cockpits

FROM the standpoint of passenger comfort in all kinds of weather the closed cabin type of plane has won almost universal praise from the traveling public. However, according to many pilots the open cockpit type of plane is the best from the standpoint of piloting. Such an assertion is made, not because of poor aerodynamic qualities of a closed job, but rather because when the pilot is enclosed he loses a considerable amount of the "feel" of the plane, and is subject to what are termed as optical illusions. This is said to be particularly true when the plane is near the stalling point as it climbs into a stiff head wind. At such a time it is quite possible for the pilot, who does not happen to look at his airspeed indicator, to get the impression that he has plenty of flying speed and is merely riding up on the wind, when in reality the plane is mushing forward and on the point of stalling over on wing tip. However, if the pilot were flying from an open cockpit he would notice the decrease in the "whistle" of the plane going through the air, would hear the wind "lapping" over the windshield, and would instantly know that he was mushing forward and ready to stall.

The matter of the comfort of an open cockpit pilot flying in bad weather could be well taken care of by using the streamlined type of windshield as used on high-speed racing planes, with an arrangement whereby it could be moved forward to enable the pilot to get in or out of the cockpit. Behind such a type of windshield the pilot would be fully protected from the elements and at the same time would be able to acquire complete "feel" of the plane while in flight.

The Industry's Progress During 1928

By Earl D. Osborn

THE year of 1928 will go down in the records as one of the most significant years in the history of aviation. It has been a year of transformation such as has rarely been seen in any industry. At the beginning of the year the aviation industry was owned and controlled by a comparatively small number of men who were vitally interested, and often the sole owners of the concerns which they managed. At the end of the year we see the industry taken over by the public and under the control of various banking groups. Broadly speaking there is an entirely new line-up in which high finance plays the leading role. The pioneers of the industry have cashed in on their hard earned profits, and, while still taking an active part in the management, they have relinquished complete control. There are of course, notable exceptions but on the whole the management of the aviation industry has changed hands since the first of 1928. Even in those companies where there has been no reorganization, there has been a tendency for the banking interests to carry more weight.

Demand for Stocks Increases

What has happened is, in a way, the aftermath of the famous flights of 1927. Suddenly the public was made to realize that there was an aviation industry and it began to want to buy aeronautical stocks so as to make the same profits that were gained by those who got in on the ground floor of the radio and automobile business. Following on this demand bankers began to look in on the situation. They found a demand for planes and engines which far exceeded the supply. They found that military manufacturers and, on a smaller scale, commercial manufacturers had made good money. Many of the air mail lines were operating at a profit, but above all the industry seemed to be growing, and there was a very real need for capital to meet the increasing demand for aircraft. Between the bankers and the public, offers which were almost irresistable, have been made to almost every airplane manufacturer. The ease with which securities bearing the aeronautical label were sold made it easy to refinance and put through all sorts of combinations on terms which were very favorable to all those taking part in the deal. Extensive financing of new projects has been put on the market and has been eagerly absorbed by the public. Investment trusts dealing exclusively in aeronautical securities have been formed, thus scattering aeronautical holdings still more widely, but still leaving the control in the hands of groups of bankers. 1928 has seen the aeronautical business change from what might be called a private family affair into a business which is owned by the public and controlled by the bankers.

The public's enthusiasm for aeronautical securities has filled a very real need for the capital which was necessary to develop the new industry. The intervention of the bankers has also made possible combinations which are really of greater importance than the immediate filling of a need for capital. Many industries, especially in recent years, have gone in for combinations, but as a rule these have been for the purpose of manufacturing and distributing similar products or products similar in their nature, but in a different price class. In the automobile field we have recently seen a large number of mergers along these lines. The automobile industry was well established for many years before these mergers started taking place on a large scale.

C. M. Keys, president of Curtiss Aeroplane & Motor Co., and a leading figure in the business progress of the aeronautical industry.

In the aviation field not only have these mergers taken place in a comparatively short period after the beginning of commercial aviation, but they have gone much further and include mergers of manufacturers and consumers or operators of aircraft. In the motor car and bus field practically no manufacturers operate their own products; a manufacturing company manufactures and an operating company operates. Locomotives and cars are manufactured and sold to the railroads by separate companies. Steamship lines as a rule have their ships built by independent companies. The aeronautical industry has however this year seen several important companies in the manufacturing field merge with companies in the operating field. The Boeing, Pratt and Whitney, Chance Vought grouping and the Western Air Express and Fokker grouping are typical examples of manufacturing units combining with airline operators. The tie up between the Curtiss Aeroplane & Motor Co., the Sikorsky M'f'g Corp., the Curtiss-Robertson Airplane Manufacturing Co., and the Curtiss Flying Service is along somewhat different lines, as the flying service will operate more along the lines of aerial service than along the lines of airline operation. The actual manner in which these groups will operate is of course not too definitely settled but it is plain that there will be a close connection between the management of manufacturing companies and operating companies. The same people who control the manufacturing of planes will also control the consumption of planes through their control of the operating companies.

Such a combination has very decided advantages. Sales costs and exhorbitant profits are eliminated. The operator can specify more exactly the type of equipment which he desires and his needs will be brought more directly before the manufacturer. Demand can be figured further ahead and there is less of the uncertainty of last minute orders and peak production for a few months followed by a long slack period. Other industries have not been in such a favorable position to put over this kind of a combination, because the public was not sufficiently enthusiastic about the industries to put up enough money to satisfy both the producer and the consumer that they were being well paid for the sacrifice of the complete control that such mergers entail.

Mergers Have Some Disadvantages

These mergers between producer and consumer have of course their disadvantages, but they are not inherent provided the management is sufficiently good. The consumer for example will not have the same freedom of choice of equipment as if he had no connection with a manufacturing concern. Provided that the manufacturer, with whom he is connected, turns out exactly what he needs this is all right, but there will be cases when the manufacturer's product is either not suitable to the need, or not as good as that of another manufacturer. In such a situation only good management and careful handling will avoid putting a serious handicap on the operator. There will be other cases where the operating company will run a deficit and will want to get terms from the manufacturing company which would not be to the latter's advantage. The vertical combination between manufacturer and consumer will require less salesmanship but better management than where affairs are settled by direct competition. If successful it will prove of enormous value to the industry and will set a precedent which will be of great interest to the rest of the business world.

A U. S. Army Air Corps' AT-5A (Curtiss "Hawk"), powered with a Wright "Whirlwind" and equipped with the new N. A. C. A. low drag cowling.

Although many of the manufacturers of strictly commercial planes have refinanced, there has been less tendency to merge than in the case of the companies that were manufacturing military planes. There have been combinations of military and commercial groups such as the Keystone, Loening, Travel Air group, but few if any cases of mergers of strictly commercial companies. Most of the commercial companies are adding new models rather than combining with companies that produce other types or similar types at different prices.

1928 has not brought the expected number of automobile firms into the aviation business. It had been predicted by many that the automobile manufacturers would take over the aeronautical industry but to date this has not been the case. Outside of Ford and the Velie company their influence so far has been comparatively small. There is however a very considerable amount of money invested in the aviation field which was earned in the automobile industry. Automobile dealers too are playing a more and more important part in the sale of planes.

Among the most outstanding features of 1928 was the very real increase in the prosperity of the air mail lines. Not only has the mileage flown been increased but the poundage of mail has greatly increased, especially since the starting of the five cent postage rate. The increased poundage carried per plane and the number of extra trips which have been flown has of course increased the net earnings proportionately with the gross, and practically all of the air mail contractors are out of the red and some of them are earning substantial profits. There has been a very considerable increase in the number of passengers carried and certain lines operating out of Chicago and also out of Los Angeles are depending for the major part of their revenue on passengers rather than on mail. The results of the experiments have been rather encouraging and if plans are carried out as per schedule many of the air mail routes now in operation will also be catering to the passenger trade next year. One of the most encouraging features of last year's developments was the apparent desire of the railroads to take part in the furthering of air transportation. Although the actual financial interest of the railroads in the operating companies is comparatively small their cooperation will be of inestimable value. The combined rail and plane service for passengers which is now in operation, and whose extension on a greatly enlarged scale is slated for 1929, is a most interesting development. Although it is probable that passengers will ultimately be flown through the night, the cooperation of the railroads in selling tickets, etc. will be of great help as will also be their advice in the handling of passengers.

A Ford three engined, all-metal transport monoplane at the Newark Metropolitan Airport, Newark, N. J.

1928 was not featured by the spectacular flights of 1927 and as a result there has been a certain falling off in passenger carrying at local fields. There are, however, many more people than in 1927 who are taking an intelligent interest and an active part in aviation. This is shown by the fact that the government has on file more than 15,000 applications from those desiring to become student pilots. Most of the leading newspapers are run-

(Continued on page 64)

A Review of 1928 Design Development

By Leslie E. Neville

A REVIEW of aircraft and engine design development during the year of 1928, with particular attention to the exhibits at the International Aeronautic Exposition held in Chicago, indicates that a degree of stability in design has been attained. Refinement of existing designs rather than radical departure from conventional practice was noted at the last large representation of planes of the year. Many established manufacturers are now offering new models in the weight classes above or below those in which their original products fell, and many new planes, developed along accepted engineering lines, are being offered by newly formed companies. This is also true of the engine manufacturers and indicates that demand is taking definite shape and that all of the companies are looking forward to increased production in 1929.

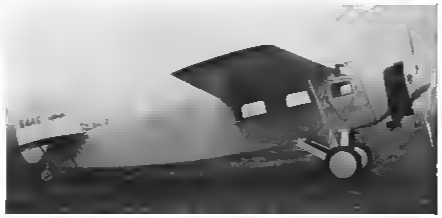
One of the outstanding design tendencies of the year is the increasing use of metal in airplane manufacturing. Several of the new planes at the Chicago exhibit had metal wing structures. Although welded steel tubing seems still to predominate as structural material, a slow but persistent movement toward the use of light metals is noticeable. Two companies at the Chicago Exposition exhibited the duralumin fuselages of their planes, the E. M. Laird Co. and the Gates-Day Aircraft Corp., whose biplane, the New Standard, G-D-24, is a recent development.

Two Other Interesting Developments

Among the other interesting developments of the year are the Thaden Type T 2, an all metal plane, and the CM-3 cabin monoplane, developed by the Federal Aircraft Corp. The Thaden craft, which is powered with a Comet engine, is a full cantilever monoplane of the cabin type, having a monocoque fuselage constructed entirely of corrugated duralumin. Shaped duralumin members extend from the rear of the engine mounting past all openings in the monocoque structure to the after end of the cabin. Abaft this point the internal bracing is entirely transverse provided by duralumin tube bulkheads riveted to the skin. Multi-spar construction is employed in the wing of this plane and consists of five spars of the plate girder type with corrugated duralumin sheathing which provides drag bracing for the wing. The wing is fitted with flaps along the trailing edge, making it possible to vary the camber.

Welded steel tube wing and fuselage structures are employed in the Federal CM-3, which is a development of the "Lone Eagle," built early in 1928 by the Ryan Mechanics Monoplane Co., which later expanded into the Federal concern. The CM-3 is a three place craft, powered with the Hallett 526 radial engine. The wing is of low aspect ratio with ribs of uniform size and the front and rear spars interchangeable. Four compression members are welded into each wing panel to take the torque between the spars which are built up of cap members joined by welded tubes in the form of a Warren truss.

Engineering work on the New Standard was done by Charles Healy Day, designer of the Standard J-1 biplane.



A side view of the new Cessna, six place, cabin monoplane. Future models will be powered with the "New Whirlwind Nine" engine.

This new plane has a fuselage structure built entirely of open section, heat treated duralumin members, most of which are of angle or channel section, bolted and riveted together. A large number of $\frac{1}{8}$ in. diameter, heat treated duralumin rivets is used at each joint. This construction bears some resemblance to current Sikorsky practice. The wing structure of the New Standard, however, is built of wood.

The uncovered duralumin structure of the Martin 74 biplane, which is to be produced as a commercial plane by the Great Lakes Aircraft Corp., also was exhibited at the Chicago Show. A new cabin monoplane, the Mercury "Kitten," having a welded steel tube wing and fuselage structure was displayed by the Aerial Service Corp.

Although greater use is being made of metal in structural work, many designers adhere to fabric covering in preference to metal sheathing, because of the comparative ease with which structural inspection and repairs can be made on the fabric covered planes. The representation of all metal planes at the Chicago exhibit was lower than that at the Detroit Show. New models in this class were exhibited at Chicago by the Hamilton Metalplane Co., and the Stout Metal Airplane Co., Division of the Ford Motor Co. Both of these planes are sheathed with "Alclad," the corrosive resistant strong aluminum alloy sheet recently developed by the Aluminum Company of America. This substance consists of a heat treated strong aluminum alloy with dense surface layers of high purity aluminum alloyed with the core. It is being used extensively for hull sheathing in flying boats and amphibians and in the construction of metal wing ribs. Stamped Alclad channel members are used in the construction of the tail units of two of the three Fairchild planes exhibited for the first time at the Chicago Coliseum.

A higher percentage of planes is now equipped with brakes and tail wheels than heretofore, according to indication at the Chicago Show. This is true not only of the heavy transprt planes but of the lighter commercial and sport craft. A number of the newer planes are equipped with folding wings and can be stored in a small space. Generally speaking, streamlining has been improved but visibility has been neglected in many of the newer planes, particularly the cabin monoplanes.

Tapered Wings Not in General Use

Tapered wings are employed in a few of the late model planes, including the "Sport Waco," developed by the Advance Aircraft Co. Although this feature contributes to the aerodynamic efficiency, it has not come into general use on account of the production complications involved. Most of the wing sections employed in the airplanes of the year have been standard curves or modifications of the known airfoil sections. Despite the fact that a large percentage of engine failure is due to fuel line difficulties, little has been done to improve this vital part of the plane.

One of the interesting types of new planes exhibited at Chicago was the cabin biplane. Several of these craft have been developed during the past year and three were exhibited at the Chicago show. This type of plane has the lower wings attached to lower longerons in the usual manner and the upper wing supported on struts considerably above the fuselage. It is obviously an outgrowth from the open cockpit biplane. Exhibitors of these planes were the Paramount Aircraft Corp., the newly formed Butler Aircraft Corp. and the E. M. Laird Co. The first of these, known as the "Cabinaire," has a capacity of four passengers, a wing span of 34 ft. 8 in., a length of 23 ft. 9 in., and gross weight of 2208 lb. It is powered with a 110 hp. Warner Scarab engine. The Butler plane, which was designed by Waverly Stearman, is also a four place craft and is powered with a Wright Whirlwind J-5 engine. The weight of this plane fully loaded is 2650 lb., the wing span 35 ft. and the overall length 24 ft., 6 in. The Laird plane, known as the LC-CA, is a six place, Wasp powered craft, having a span of 40 ft., an overall length of 28 ft. 6 in., and a gross weight of 4700 lb.

Two of the "Airsedan" models built by the Buhl Aircraft Corp., were exhibited at Chicago and one of these, the Senior Airsedan, was displayed for the first time. In these sesquiplanes, the lower wing is reduced to the point where it is merely a structural member, producing a good combination of strength and aerodynamic efficiency. The lower wing panels are almost triangular in plan form. The Senior Airsedan is designed for the Pratt & Whitney Wasp or Hornet engine, carries eight passengers and has a gross weight of 6,000 lb. The wing span is 48 ft. and the length 35 ft. 8 in.

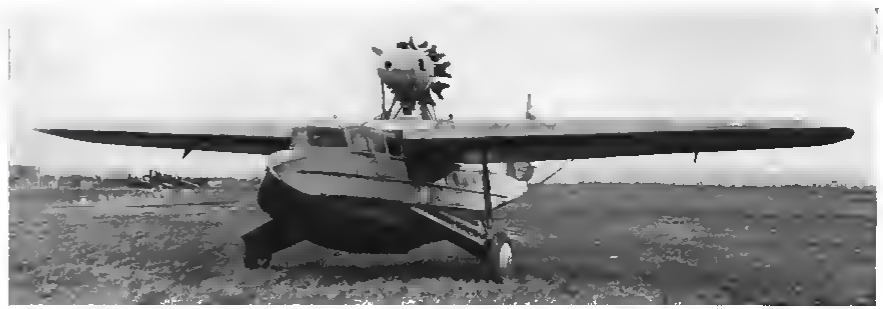
The general weight classes into which planes can be divided were somewhat wider at the Chicago show than at the other exhibits held during the year. However the majority of comercial land planes, with the exception of large transport planes and light single seaters, fall into four general groups having gross weight ranges of 1,000 to 2,000 lb., 2,000 to 3,000 lb., 3,000 to 4 500 lb., and 4,500 to 6,000 lb.

The predominating class in point of numbers is the second of the above mentioned. Twenty-one of the 76 planes exhibited at Chicago were included in this group, this being a higher representation of the group than that at the Detroit Show.

High Degree of Refinement Attained

Thirteen of these were the well known three place, open cockpit, single bay biplanes which were developed from the training planes of the War period and have given proof of their practical value in general service. These planes constituted the first type of commercial craft and have been refined to a high degree. This type was represented at the show by Travel Air, Swallow, Eaglerock, American Eagle, Spartan, Command-Aire, Waco, Stearman, Pitcairn, Challenger, Laird, Phantom-Knight and Monarch.

Six of the remaining eight were cabin monoplanes, and two cabin biplanes of three and four place type. These included the Aristocrat, Curtiss Robin, Wallace, Stinson Junior, Cessna, the new American Eagle, Butler and Cabinaire. Of these the recent developments are the Aristocrat and the American Eagle, Model A-329. The Aristocrat is a three place monoplane powered with a Warner Scarab engine and manufactured by General Airplanes Corp., Buffalo, N. Y. It has a wing span of 36 ft. 2 in., an overall length of 25 ft. and a gross weight of 2000 lb. Several interesting features are embodied in the design including slotted ailerons and a cantilever landing gear. Each axle is supported on a single duralumin box member hinged to the lower longeron and extending up-



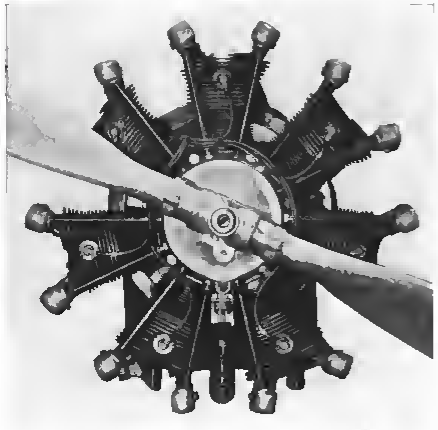
A front quarter view of the newly developed Fokker F-11 amphibian flying yacht. The first model is powered with a Pratt & Whitney Wasp engine.

ward into the fuselage with rubber discs at the upper end to absorb the shock The position of the shock absorbing mechanism within the fuselage eliminates drag and produces a very clean landing gear after the fairing has been applied to the duralumin radius members.

The American Eagle monoplane is of conventional design powered with the Wright Whirlwind J-5 engine and has a wing span of 34 ft an overall length of 24 ft and a gross weight of 2,000 lb

Many of the planes in this class and all of the open cockpit biplanes were designed originally for the Curtiss OX-5 engine and, when demands for higher performance were made, the J-5 Whirlwind was substituted. This change produced very desirable performance but necessarily placed the planes in a higher price class The demand for a lower priced plane persisted and, with the diminishing supply of OX-5 engines, manufacturers were faced with the necessity of obtaining an engine of approximately 100-150 hp and several new engines were developed to meet this emergency. Foreign power plants have been imported and in some cases licenses obtained to manufacture them in this country. The instability in this important matter can easily be seen when it is noted that the planes of this class are now offered with Comet, Curtiss, Hispano, Kinner, Siemens, Walter and Warner engines as well as the Whirlwind and OX-5 installations This chaotic condition is hindering quantity production and complicating distribution

Second in numbers at Chicago were the planes of 1,000 to 2,000 lb class with power plants ranging from 55 to 110 hp The increased popularity of these planes during



The recently developed Hess "Warrior" engine which develops 100 hp

the year is partly due to the demand for light, medium priced craft for sport and commercial use, and partly to the power plant problem which exists in the previously mentioned class of planes Engines of somewhat lower power can be used in planes of the lighter class, which are usually of the two place type, resulting in a total price within the means of persons who fly for pleasure A number of these planes has been designed for training purposes, where a low priced and rugged craft also is required The widespread demand for flying instruction and the increasing use of light planes for business and pleasure trips indicated that craft of this type will constitute one of the principal classes of commercial airplanes of the future.

Planes of this type, exhibited at the Chicago show were Swallow T-P, Consolidated "Husky Jr.", Driggs "Skylark," Hess "Argo," American Eagle A-429, Acme, Mohawk Pinto, Monoprep, Monocoupe, Arrow, Fairchild 21, Air Trainer, De Lloyd, Jack Stinson, Simplex, Mercury Kitten, Star "Cavalier"; the DH Moth, which is to be produced in America by the Moth Aircraft Corp., and the Avro Avian, which is distributed in this country by Air Associates Inc Of these, eight are biplanes and 11 are monoplanes, three of the latter being of the low wing type. Five of the high wing monoplanes are of the cabin type.

Warner "Scarab" in "Husky Junior"

One of the outstanding planes in this class is the Consolidated "Husky Junior" This biplane has been designed primarily for training purposes and pilot and student sit in tandem in a single cockpit, facilitating communication in dual instruction. This plane is powered with a Warner Scarab engine, has a wing span of 28 ft, a length of 20 ft 9 in, and weighs 1,625 lb fully loaded Another plane designed specifically for training purposes is the Swallow T-P. This craft is a two place, open cockpit biplane, weighing 1,270 lb and designed for the Curtiss OX-5 or any other engine from 80-100 hp The Driggs "Skylark" open cockpit biplane, powered with the new 55-60 hp Michigan Screw Co "Rover" engine, and the Hess "Argo" open biplane, powered with the new Hess "Warrior" engine, also are new developments

Perhaps the most recent development among the low wing monoplanes of this group is the Fairchild 21 training plane, powered with an Armstrong-Siddeley "Genet" engine This power plant is of British manufacture and is a five cylinder, radial air cooled type, developing 80 hp at 2,200 r p m The plane is a two passenger tandem cockpit, semi-cantilever type having a wing span of 28 ft 3 in, a length of 21 ft. 6 in, and a gross weight of 1,250 lb The craft is of conventional construction except for the Alclad channels used in building up the tail unit structure.

Stick and Cable Operated Brakes

Another interesting plane representing the upper weight limit of this class was the Mercury Kitten, previously mentioned. This three place cabin monoplane is powered with a Warner Scarab engine and has a wing span of 35 ft 5 in, a length of 23 ft 6 in, and a gross weight of 1,850 lb Among the unique features of the Kitten besides the metal wing structure, are the brakes operated by cables when the stick is pulled back From the stick the cables pass over the rudder pedal mounting shaft which carries cams so placed as to tighten the cable on the side on which the rudder pedal is depressed. This plane is also equipped with a tail wheel built into the rudder which facilitates steering on the ground.

Eight planes of the 3000 to 3500 lb gross weight class were exhibited at Chicago representing Mahoney-Ryan, Bellanca, Stinson, Fairchild, Travel Air, Buhl, Mono Aircraft and Gates-Day. All of these with the exception of the Gates-Day and Buhl craft are cabin monoplanes characterized by wings of uniform section and thickness, hinged at the top of the fuselage and externally braced The Wright Whirlwind J-5 engine is the predominating power plant in this class, the principal exception being found in the Monocoach, which is powered with the new Velie L-9 radial air cooled engine. These planes have

(*Continued on page 58*)

Selling *the* Plane Market *in* 1929

By R. Sidney Bowen, Jr.

FOR almost two years now, airplane manufacturers in this country of ours have been working their heads off, and those of their staffs, in a grand and glorious effort to ride atop the wave of aeronautic prosperity that began with Colonel Lindbergh's arrival in the "Spirit of St Louis" at Le Bourget Field Production to meet the demand was the need of the hour, and, as a means of fulfilling that need, the companies existing at that time immediately engaged in the task of enlarging their output facilities That meant, in many cases, reorganization and recapitalization from the ground up, to say nothing of rearrangement of factory layout, etc And, in keeping with the hectic strides forward that were suddenly made, airplane "factories" began to spring up over night in back yards all over the country. Some of these thrived and carried on while others sprang right back again into oblivion as far as the aeronautic industry was concerned

A Production Increase of Over 100 Per Cent

However, the old and the new companies which managed to "stand the gaff" performed a highly commendable piece of work in turning out the number of planes that they did. Figuratively speaking, from a standing start they hit top speed in less than no time In 1927 a total of 1,995 new planes was produced, and, although complete statistics have not as yet been compiled, it can be taken for granted that an increase of over 100 per cent was attained in 1928.

On the other hand, the fact that some 6,000 planes, turned out of the factories since Jan. 1, 1927, are taking the air, or ready to take the air, does not mean that the supply equals the demand Far from it The possibility of a saturation point does not even enter the picture at present The item of production however, will not hold the center of the stage during 1929 The items of sales and service are coming into their own, and to these two equally important factors in the prosperity of an airplane manufacturing company should be given undivided attention and consideration Undivided attention, not because the supply equals the demand and "pickings" are small, but because that demand, which is increasing with each new day, is becoming most particular and finicky And rightly so With a wealth of different types of planes from which to choose, the prospective customer is now taking his own sweet time in deciding his purchase. In other words, the airplane buying public can go "shopping" now and seek out the best all-round value for its money Therefore, the paramount question of today is "how can I best sell the 1929 market?"

Before considering the various methods of selling the 1929 market, perhaps it might be of some value to try and figure out the proportions of that market, its best sales spots and its weak sales spots as they happen to exist at the present time.

It was mentioned above that production for 1928 totaled 100 per cent more planes than were produced in 1927, in other words, around 4,000 planes. For the sake of calculation let us assume that 4,249 planes were produced in 1928, as that figure corresponds with the total number of planes licensed, temporarily licensed, and identified by

An Alexander Eaglerock powered with a Menasco engine

the Aeronautics Branch, Department of Commerce, as of Oct 6, 1928, (Table I). And, so that we may be sure of being on the safe side, let us assume that the total production for 1929 will be a 50 per cent increase over 1928, or, in other words or figures—6,374 planes

Using Table I as our guide let us now proceed to divide the country into units of states according to grographical location

First, the New England group consisting of Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island The total of this group amounts to 190 planes, 101 of which are located in Massachusetts Taking into consideration our estimated production increase of 50 per cent for 1929, there exists in the New England group a market for 275 planes during the year In view of the fact that over 50 per cent of this estimated market is represented by one state alone, Massachusetts, it would seem altogether advisable that intensive sales effort be exerted in Maine, Vermont and New Hampshire where at present only 19 planes are taking the air

The next group, the Middle Atlantic States, consisting of New York, New Jersey, Pennsylvania, Maryland,

Delaware and the District of Columbia has a total of 785 planes within its borders. Therefore there would seem to be some 1183 sales that can be closed this year. The leading state is New York with a present total of 382, Pennsylvania comes next with 215, and so on down the line to the weak spot, Delaware, which has only eight planes with which to dot its skies. Even though it is a little state in area it should prove to be a better market than that.

Then comes the South Atlantic group composed of Virginia, West Virginia, Kentucky, Tennessee, North and South Carolina, Georgia, Alabama, Mississippi and Florida. This group, which incidentally has an area three times as big as the Middle Atlantic group, but is not even in the running as regards population, boasts a total of 299 planes distributed about its various airports and flying fields. Florida leads the pack with a total of 59 planes and Alabama is at the end with a total of 10 planes. According to the 50 per cent. estimated increase, this group should absorb some 449 planes of this year's production. However, in view of the fact that this territory has only three airplane manufacturers whereas the Middle Atlantic group, for instance, has about 45, the "Patronize your neighborhood store" idea is out of the picture, and therefore it is a sort of virgin territory with respect to sales competition coming from the outside. Real sales work in this section should prove highly profitable.

Heading west we come to the South Western group made up of Louisiana, Arkansas, Oklahoma, Texas, New Mexico, and Arizona. Led by Oklahoma with a total of 132 planes, with New Mexico bringing up the rear with but five planes, this group has a grand total of 282 planes listed on the records. The manufacturing situation here is similar to that existing in the South Atlantic group, and therefore with plenty of sales elbow grease it should not prove particularly difficult to boost up the estimated sales figure of 423 planes for 1929.

The next group on the program is the Middle Western set consisting of Ohio, Indiana, Illinois, Michigan and Wisconsin. To this group goes the blue ribbon for

A Monocoarh powered with a 9 cylinder Velie engine

within its borders it has a total of 1097 planes to take off and land again. Illinois leads the parade with 380 planes and Wisconsin forms the rear guard with a total of 114 planes, which, incidentally, is 13 more than the leader of the New England group and 55 more than the leader of the South Atlantic group. Multiplying by the well known 50 per cent. we have a potential market for 1646 planes between now and next Christmas. Competition in this territory should be rather keen as there are now some 44 airplane manufacturers located within its borders and the planes they are turning out include all types and sizes. It will be interesting to watch developments on this "battle ground."

Heading west once more we come to the Central Northwestern group which includes Minnesota, Iowa, Missouri, Kansas, Nebraska, North and South Dakota, Colorado, Wyoming and Montana. This section which is the greatest in area can boast of a grand total of 743 planes recorded on the books. Missouri holds first place with 204 planes and Wyoming holds last place with nine planes. Giving the 50 per cent. idea due consideration we find that this section of the "wide open spaces" should take care of 1,115 planes sales this year. However, in view of the fact that several live-wire airplane manufacturers are situated in this territory it would not be at all surprising if they succeeded in raising that figure considerably before Santa Claus pays his next visit to these parts.

And last, but not least, comes the Pacific coast group that includes California, Nevada, Utah, Idaho, Oregon and Washington. Lead by California with 588 planes, which is more than the total of either the New England group, the South Atlantic group or the South Western group, this Pacific Coast combination has 735 planes in its territory. The tail enders of the group are Nevada and Idaho which have five planes each. The manufacturing situation is of interest in this section in view of the fact that of the 33 airplane manufacturers listed as being located in the territory, 30 of them are in California. That leaves three manufacturers in five states, which in turn leaves plenty of room for sales invasions from all directions. Such invasions, if properly conducted, will undoubtedly result in more sales being created than the 1103 estimated for the Pacific Coast group during 1929.

Thirty Planes to Alaska

So much for the 48 states and the District of Columbia. Going outside of the country proper we find that Alaska has 15 planes on the books and the Hawaiian Islands three. In keeping with the steady increase of flying in Alaska we will pass up the 50 per cent. increase estimate in this case and state that there will be a market this year in that part of the world for at least 30 planes. And as regards the Islands we will venture to say that at least 10 commercial planes can be sold there during the year. Both sections are practically virgin territories and a bit of concentrated sales effort would do no harm whatsoever.

And now as to those two important items of sales and service.

Whether the commodity be airplanes, grand pianos or brass hairpins the fundamental principles involved in selling the customer are the same. First, the creating of interest by educational means or otherwise; second, the establishing of a desire to possess, and third, the holding of the good will of the purchaser so that he continues his patronage, and, as a booster, creates the foundation for new business.

It is the application of these principles to the task in hand that differs. The methods used to sell hairpins do not necessarily correspond with those used to sell grand pianos, or airplanes, or anything else for that matter. Therefore, it is up to the individual manufacturer to study and analyze his buying public and decide for himself how he can best reach the pocketbooks, and—what is more—keep on reaching them in the future.

For the present, the airplane manufacturer can find no better example of the line of action he should follow in his sales work than that which is now followed in the automobile industry.

It is admitted at this point that a few of the progressive plane manufacturers have already adopted automotive sales and distribution policies, but for clarity it might be worthwhile to outline the various parts of a sound and workable national sales organization.

The manufacturer is the big mogul. Upon his shoulders rests the responsibility for the success or failure of his product. However, in view of the fact that it is impractical for him to handle retail sales, he divides the country into territories, as many as he deems necessary. The division of territories is usually based on population. In each of these territories he appoints a distributor who buys at a fair sized discount from the manufacturer and maintains a small stock of products at all times for distribution throughout that particular territory.

In the appointing of a distributor the manufacturer should be most particular. It should be a firm or individual of good repute and possessed of sufficient finance for the undertaking. For, in the distributor the manufacturer has to place his trust that that person, or firm, will endeavor to obtain the full quota of sales possible in the territory. In order to do that effectively, the distributor in turn sub-divides his territory into districts and appoints, subject to the approval of the manufacturer, dealers to contact the customers and make the actual sales. To these dealers is allowed a liberal discount. And to these dealers should be given a maximum amount of aid and cooperation at all times. They are the ones who come in contact with the customer, and in their hands is the power to kill a sale and drive the customer to a competitor. In other words, cooperation throughout the entire sales organization is the important factor that tends for success and profits. But more about that later.

TABLE I

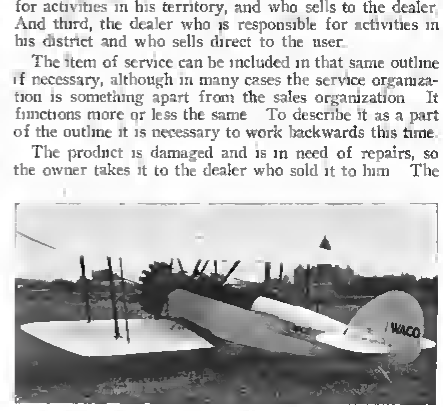
Status of Registered Aircraft by States on Oct. 6, 1928.
(Compiled by the Aeronautics Branch, Department of Commerce)

	Lic	Temp	Ident.	Total
Alabama	3	2	5	10
Arizona	2	4	0	6
Arkansas	23	13	24	60
California	234	105	249	588
Colorado	15	6	10	31
Connecticut	36	9	9	54
Delaware	7	1	0	8
Dist of Col	35	3	1	39
Florida	26	6	27	59
Georgia	26	6	19	51
Idaho	1	2	2	5
Illinois	136	69	175	380
Indiana	29	24	50	103
Iowa	25	15	39	79
Kansas	52	39	50	141
Kentucky	8	4	8	20
Louisiana	22	8	18	48
Maine	4	0	5	9
Maryland	22	6	14	42
Massachusetts	49	17	35	101
Michigan	110	77	63	250
Minnesota	53	19	37	109
Mississippi	9	1	2	12
Missouri	91	38	75	204
Montana	8	5	23	36
Nebraska	25	19	50	94
Nevada	0	1	4	5
N Hampshire	4	1	1	6
New Jersey	46	25	28	99
New Mexico	1	1	3	5
New York	211	65	106	382
No Carolina	22	8	12	42
No Dakota	1	1	18	20
Ohio	92	60	98	250
Oklahoma	51	24	57	132
Oregon	14	6	14	34
Pennsylvania	135	44	36	215
Rhode Island	9	3	13	16
South Carolina	8	1	3	12
South Dakota	7	6	7	20
Tennessee	18	4	10	32
Texas	73	28	30	131
Utah	6	4	3	13
Vermont	2	1	1	4
Virginia	21	6	14	41
Washington	53	14	23	90
W Virginia	7	5	8	20
Wisconsin	43	26	45	114
Wyoming	5	1	3	9
Alaska	7	7	1	15
Hawaiian Is	1	2	0	3
Total	1,879	842	1528	4,249

Thus we have three distinct parts that make up the outline of a sales organization. First, the manufacturer who is responsible for everything and who sells to the distributor. Second, the distributor who is responsible for activities in his territory, and who sells to the dealer. And third, the dealer who is responsible for activities in his district and who sells direct to the user.

The item of service can be included in that same outline if necessary, although in many cases the service organization is something apart from the sales organization. It functions more or less the same. To describe it as a part of the outline it is necessary to work backwards this time.

The product is damaged and is in need of repairs, so the owner takes it to the dealer who sold it to him. The



A Waco 10 powered with a Wright "Whirlwind" engine

dealer may have a repair shop equipped to do the repairing. If so, *voila*! If not, he sends it to the distributor for repairs. The distributor of course has a better equipped shop and can usually take care of the job. However, if such be not the case, he in turn sends it to the factory where it is repaired or a new part substituted, etc. Many times, though, the customer may go direct to the distributor, but the rule is that the distributor usually does not go after such work except, perhaps, in his immediate vicinity. He is more interested in doing work for the dealers. In connection with this item of service it should of course be realized that the stocking and handling of spare parts, etc., is usually included as a part of the servicing end of the business. There is, of course, the party known as the jobber, but he usually handles a great variety of parts of different manufacture and therefore cannot be considered as an integral part of an individual manufacturer's sales organization.

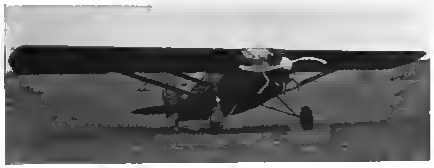
Many Minor Problems Pop Up

It can readily be seen that with a big national sales and service organization, as outlined above, there are bound to be a hundred and one minor problems popping up now and then which need immediate attention. Sometimes such problems and snags can be adequately taken care of by the dealer or the distributor, but as an added precaution against complete defeat, and the ultimate loss of a customer, and as an added means of contact with his entire sales organization, the manufacturer maintains a corps of sales and service engineers in the field at all times. These men keep circulating among the distributors and dealers and lend all assistance possible. Sometimes they spend but an hour or two with a dealer, and other times they may stay a week to assist perhaps, in the taking of an inventory, the laying out of a retail sales campaign, the setting up of new repairing equipment in the shop, or to supervise some special repair job, etc. In other words, these sales and service engineers are the

ones who do the actual contacting of the sales and service organization, and they are the means by which the manufacturer is able to ascertain how things are going all over the country.

In the automotive industry field men for ignition companies have proved to be of inestimable value. And in the aeronautic industry, field men for engine manufacturers should be most worthy of their salt. In this respect, it would seem highly advisable for the plane manufacturer to cooperate with the engine manufacturer in every possible way. For, strange as it may appear, the customer usually damns the whole business if the engine happens to pass out at frequent intervals. He does not take into consideration that the plane had nothing to do with the actions of the engine, and merely gets sore at the make of plane that he purchased. Therefore, increased sales depend to quite an extent upon engine performance, and a much closer working arrangement between engine and plane manufacturer will prove to be mutually beneficial. Just now, as far as the customer is concerned, it is a question of, united we stand and united we fall!

As has already been stated, the dealer is responsible to the distributor, the distributor is responsible to the



A Stinson "Junior" powered with a Warner Scarab engine.

manufacturer, and the manufacturer is responsible for everything, as it were. On the other hand the manufacturer must always keep himself and his product sold to the distributor and in turn the distributor must keep himself sold to the dealer. And, naturally, the dealer must keep himself and the product sold to the customer. In other words, the various parts of a sales organization must have the good-will of each other, and the entire organization must have the good-will of the customers. If not, then the monkey-wrench appears in the works, and the results of such an appearance can be most disastrous.

To sum it all up, it is *cooperation* from the top right on down the line.

From the standpoint of the manufacturer, there are innumerable ways to cooperate. Some of them are:

First—by producing a quality product.

Second—by keeping up with the times as regards that product and how it is made, etc.

Third—by keeping factory representatives in the field, as mentioned above.

Fourth—by helping a distributor to make a sales analysis of a territory, and by giving him the benefit of experience acquired in this phase of the work.

Fifth—by keeping the distributors informed of activities at the factory, such as plans and designs for new models, parts, equipment, etc. One of the quickest ways to incur the ire of a distributor or a dealer, is for the manufacturer to leave them high and dry with obsolete stocks on their hands. This can be taken care of by advance notice and some sort of a refund idea. Another way to keep the organization informed of what is going on, is by the publication and distribution of weekly or monthly sales bulletins, or—better than that—a manufacturer's house organ. The latter is well known for its real value in many industries. If made sufficiently attractive and interesting it is well received, even by prospective customers.

Sixth—by turning all sales leads over to the proper parties. Stealing sales will lose a good distributor or dealer, quick as a wink. No man is going to invest his money in a distributorship if the factory is going to be his direct competitor. It is true that when sales fall off in some localities, and for no apparent reason except laziness on the part of the distributor, the manufacturer sometimes invades that territory as a means of jacking up the other party, in the event that he decides not to call the contract off. And, when the dealer is the guilty party, it is the distributor who does the invading and direct selling—and retains the full commission.

Direct Sales Commissions

There is, of course, the problem of a customer demanding that he buy direct from the factory. In such a case, if the customer cannot be persuaded to go to the right place and there is the possibility of losing the sale, the manufacturer takes the customer's money and then credits the various parties with the amount of the commissions due them, had they made the sale. Whether the full amounts are credited is up to the individual manufacturer. Sometimes the split is different. However, the idea is—that it is not practical, nor profitable, for the manufacturer to compete with a distributor, or for a distributor to compete with a dealer, except when necessary.

Seventh—by educating the buying public as to the advantages, etc., of owning an airplane. This is done to a large degree by national advertising. The manufacturer advertises his product, not with the idea of bringing direct sales to his door, but with the idea of keeping the name of the product, its merits, etc., before the eyes of the buying public. In other words, it is the ground work necessary for extensive retail sales. It is part of the application of the fundamental principles of selling. The manufacturer's advertising creates the interest, the distributor's and dealer's local advertising, contact and demonstrations, establish the desire to possess; and the proper functioning of the entire sales and service organization holds the good-will of the customer. Many times national advertising does not mention price at all. It merely dwells upon other merits of the product and the advantages of ownership.

Co-operative and Zoning Advertising

Another way that a manufacturer can cooperate with advertising is by what is known as co-operative and zoning advertising. In the advertisement there is contained a list of the names and addresses of the distributors and dealers located in the territory covered by the circulation of the particular publication. Sometimes, the zoning part is left out and the advertisement carries the complete list of distributors and dealers (including service stations). That type of advertising is often found in the trade publications. Trade publication advertising is essential to the manufacturer, not so much from the standpoint of retail sales to the public, as from the standpoint of advertising the product to the trade and, POTENTIAL DISTRIBUTORS AND DEALERS. The manufacturer, if he is up and coming, is always seeking to strengthen his national selling organization, and it has been proved in the automotive field, and is being proved in the aeronautic field, that one of the best ways to do that is by advertising in the trade publications. The man who desires a distributorship or a dealership of a good product does not search for that product in publications outside its

(*Continued on page* 54)

Recent Developments *in* Aircraft Armament

By Capt. R. C. Coupland
Ordnance Department, U. S. Army

In order that the readers of this article may more clearly understand the fundamentals governing the development of aircraft armament, it is pertinent to point out some present day ideas of air tactics and the general trend of such tactics, which must of necessity bear a direct influence on armament development.

In dealing exclusively with military aircraft, boards of officers are usually formed to make recommendations and comment on various types of airplanes submitted by contractors under specifications outlined by the Office, Chief of Air Corps. In choosing airplanes from a competitive lot, the particular board concerned would survey each airplane thoroughly through flight tests and by inspection, bringing out the mechanical and tactical features of defect and superiority. This finally leads to the elimination articles that do not show promise, and to the acceptance of those that do, with recommendations for possible improvements in each case.

The Army, at present, is giving considerable attention to bombing, and there appears to be a general feeling that the ability of the airplane to strike blows commensurate with its cost, is in the direction of bombs, either high explosive, or chemical. The advantage of the airplane in comparison with the artillery as a conveyor of high explosive, or chemical bombs to a given point, lies particularly in range and somewhat in the unit quantity and gross quantity that may be delivered in a very short interval of time. At the present time, artillery is conceded to have better penetrating effect, due to the terminal velocity of the projectiles in comparison with bombs and it is very probable that artillery has considerably more accuracy at normal ranges when average weather conditions are considered. Artillery can also bear fire pressure on a given point over a long period of time.

Fig. 2. A ring type mount of latest design for a .30 caliber machine gun

Fig. 1. One of the latest developments in American heavy bombardment planes.

In view of this, the airplane bombardment tacticians have, therefore, constantly agitated for improvement, and continual improvement, in accuracy for bombardment airplanes. To do this, consideration must be given to the following:

(a) Stabilization of the airplane proper. This is a matter of both longitudinal and horizontal stability of the aircraft at the time of release, and is dependent on the inherent stability of the aircraft, the technique of the pilot, and to a greater extent on weather conditions.

(b) The stability of the bomb sight with reference to the earth's surface. This naturally is involved in the ability of the sight to accurately measure and compensate for all varying conditions of angle of approach, speed of target, speed of bombing plane, height above target, wind velocity, etc.

(c) The accuracy of the director equipment which guides the pilot on the proper line of approach.

(d) The mechanical releasing apparatus for the bombs.

In connection with the above considerations, material errors may creep in at any one point, and when it is pointed out that the bomb must be released at a given point situated on a hypothetical circle surrounding the target at the altitude at which the bomber is flying, it becomes necessary to make the corrective action for accuracy a fundamental consideration, in the design of the airplane, the training of its personnel, as well as in the mechanical bombing equipment. Considerable improvement in this direction has been made since the World War, and the project is continuously and energetically carried on by the Air Corps.

One of the latest developments in American heavy bombardment airplanes is shown in Fig. 1. This is a twin engined bomber, in which the protective armament is dispersed about the plane, with a general view to decreasing the weight, and at the same time cover all vulnerable zones by at least one gun. One gun covers a given zone and is not entirely supported by any other gun, and when one gun or gunner is eliminated, the plane lies to some extent unprotected from a portion of that zone.

Bombardment policy gives secondary consideration to protective armament, due probably to the fact that protective guns may be a hindrance in night bombardment rather than a help, as danger from night flying pursuit airplanes is considerably less at night. The chief danger arises from surface fire or protective measures in con-

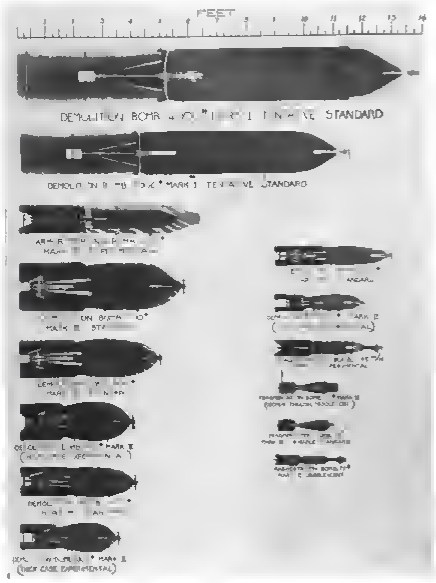


Fig. 4. Types of projectiles or bombs used for dropping from airplanes.

tact with the surface. It is, therefore, questionable whether the small value arising from defensive armament on bombers for night work balances the disadvantages, such as extra weight and personnel involved. On the other hand, day bombardment planes are very likely to come in contact with enemy airplanes.

For this reason, defensive armament is highly desirable for daylight bombardment airplanes, in order that in some cases their mission may be carried out successfully, and to insure, or enhance the possibility of each bombardment plane returning to its base. The bomber mentioned has a twin engine installation with an engine on each side of the fuselage. In each nacelle back of the engine is a gunner's cockpit, and there is also a gunner in the nose of the fuselage. This seems to give excellent protective ar-

Fig. 5. Showing method of attaching bomb to rack fastened to lower section of fuselage.

rangement. There is a possibility of cross fire over and under the rear portion of the fuselage and tail, and the frontal area protection is obtained by the nose gun, although this does not cover all the area under the wings and forward portion of the fuselage.

A short study of this arrangement, however, makes evident the following disadvantage: in the first place, each gunner is completely isolated from the other; one gunner, or gun being put "out of action" in either of the two nacelle positions, would make it very difficult to replace either and cover the exposed area. If such areas are not covered, the plane is open to unhindered attack by the enemy from that quarter. This lack of mutual support of personnel and material is clearly understood by the Air Corps, but due to the tremendous problems involved in proper structural arrangements and balance, suitable concentrations have not to date been evolved.

Tacticians seem to feel that although complete mutual support is not obtained on each individual airplane, yet mutual support will be obtained between airplanes in a close formation, a reasonable assumption, if the plane formation can justifiably be held close under fire. The predominant school believes that at present it can be done. "Close" in this sense means that the planes shall be in such a close formation that all of them can bear effective fire on an attack aimed at any plane in the formation.

There are, however, some serious considecations regarding this matter. A close formation over enemy territory offers a much better opportunity for hits by antiaircraft fire, as the maneuverability of planes in formation is decreased, target area is increased, and one high explosive shell may possibly destroy more than one airplane. The foregoing are increased hazards that would arise from the ground, and would only be true in the presence of a threatened air attack; otherwise, the formation could "open up." A close formation would also offer some extra considerations from an air attack, as it would be as a whole a greater target for long range, heavy gun fire, such as the caliber .50 machine gun, or larger.

There is every possibility of a bombing formation being attacked by fragmentation or demolition bombs, timed to explode after dropping a predetermined distance. The proper number of feet may be determined by the attacking planes by flying on the same level as the bombers, then quickly climbing to the proper position above them before the release of bombs, or to have one plane remain

on the same level with the bombers to signal by radio, or other devices, the altitude at which the bombers are flying, thus allowing the attacking planes to estimate the proper position for release. Such an attack would undoubtedly break up a bombing formation, as a minimum consideration, and would allow of an immediate machine gun attack on the separated bombing planes.

Heavy bombardment airplanes in their present status are particularly weak defensively. Darkness is their greatest ally in this respect, and a formidable enemy for

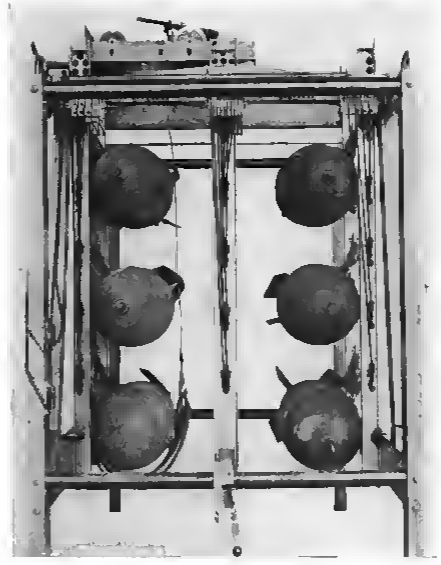


Fig. 6a. A mechanically operated internal bomb rack of recent design.

offensive purposes. It, therefore, appears desirable to make the big bombers defensively stronger and able to hold their own individually. This may some day be obtained by a suitable grouping of the allowable weapons, so that a quick change of personnel or weapons may be effected to bring fire power to bear at any point under strong pressure. It will then be practically impossible for the enemy to ascertain the unprotected zones, so long as any personnel or guns remain in operation. In general, increased lifting capacity, which is in the ultimate increased offensive power, has far surpassed the defensive power for daylight operations. It must be borne in mind that the problem is a difficult one and involves many considecations.

Many improvements in the mechanical handling of equipment for protective armament on bombers have been made since the World War. A description of some of this equipment follows:

Fig. 2 shows a ring type of mount of latest design for caliber .30 machine gun. This mount is considerably heavier than the old wartime ring, but embodies several new features. The first is a virtual three point suspension for the removable ring elements, which practically eliminates the possibility of binding due to warping of the fixed ring and fuselage during flight. Gun weight compensation is obtained by adjustable coil springs; and horizontal slipstream compensation is obtained by a coil spring operating on a suitable cam, which tends to rotate the ring against the pressure of the airstream.

No attempt has yet been made to compensate for the effect of the airstream on vertical operation, that is the raising and lowering of the gun in the vertical plane. This compensation is considered less important than the horizontal and weight compensation, and, in consequence, has not been considered serious at present.

I have not mentioned the possibilities of pursuit protection of bombers. To transfer the protective armament from bombers to conveying machines, brings up tactical considerations beyond the scope of this article. It is needless to say, that for bombardment airplanes to rely entirely on such protection is certainly precarious business under many conditions that may arise. The general scope of the projectiles, or bombs, used for dropping from airplanes, is shown in Fig. 4. The small fragmentation type of bomb is so constructed that the greater portion of the weight lies in the metal case. This case is thick, and designed in such a manner that the bursting charge breaks the case into small fragments and propels them at high velocity in all directions. Such a bomb is designed primarily to be used against light equipment and personnel.

Demolition effect appears to have reached major importance in bombing for all types of surface targets, and, in consequence, there is a greater variety and range of such bombs. They are chiefly designed with a comparatively thin shell, only with sufficient strength to withstand the shock of impact on hard surfaces. This allows of larger explosive material in proportion to the total weight, and a consequent increase in efficiency from a demolition

Fig. 6. Showing the release and safety mechanism used with racks in Fig. 6a.

standpoint. These bombs range through a wide field, 100 lb. up to 4,000 lb., and they are usually fused for some delay action, allowing a certain amount of penetration before detonation.

It is even more important to obtain increased cavity volume for chemical bombs. The desirable thing would be to deliver as much chemical per given load weight as possible, due to the fact that no penetrating qualities are needed for a chemical bomb, and the breaking of case on impact is desired. For standardization purposes a com-

(Continued on page 47)

Committees for New York Aviation Show Announced

General and International Groups for February Exhibit Include Prominent Names

NEW YORK, N Y —The general committee and honorary international committees for the New York Aviation Show, which is to be held at the Grand Central Palace, Feb 6-13, under the sponsorship of Aviators' Post No 743, American Legion, have been announced by the executive group in charge Thirty-seven men and women compose the general committee They are Hon Harry S New, Postmaster General, Hon Alfred E Smith, Hon Franklin D Roosevelt, Hon John H Trumbull, Hon James J Walker, Maj-Gen Robert Lee Bullard, Maj-Gen James E Fechet, Maj-Gen William Weigel, Rear Adm William A Moffett, Rear Adm Louis de Steingeur, Amelia Earhart, Clarence Chamberlain, Augustus Post, Lady Diana Heath, Lieut Thomas B Mulroy, U S N R, Hon Royal S Copeland, Hon Fiorello H La Guardia, William C Heppenheimer, Col Lemuel Bolles, Emanuel Cohen, Col Walter A De Lamater, Col Harold E Hartney, Maj Geo A Vaughn, Martin Jensen, Maj Wm J Hammer, Geo H Sherwood, Hon John Boyd Thacher 2d, William R Hearst, Capt Eddie Rickenbacker, Bernard Gimbel, Hon George J Ryan, Hon William J O'Shea, James Kimball, Dr Frederick L Hoffman, Dr Wilbert W White, Merrill Hamburg, and T A Dwyer

Seventeen persons prominent in diplomatic circles either as representatives of the United States or of other governments, compos the Honorary International Committee, as follows

Model Plane Group Named

Hon Florencio Arosemena, president of Panama, Hon Miguel Paz Barahona, president of Honduras, His Excellency Don Manuel C Tellez, ambassador from Mexico, His Excellency Don Orestes Ferrara, ambassador from Cuba, His Excellency Don R J Alfaro, minister from Panama, His Excellency Noble Brandon Judah, U S ambassador to Cuba, His Excellency Don Angel Morales, ambassador from the Dominican Republic, His Excellency Arthur H Geissler, U S minister to Gautemala, His Excellency John G South, U S minister to Panama, Sr William Wallace White, consul general of Paraguay, Sr Luis E Feliu, consul general of Chile, Sr D Jose de Riching, consul general of Uruguay; Sr Augusto Merchan, consul general of Cuba, Sr Mariano P Guevara, consul general of Honduras, Sr J Solorzano Diaz, Consul General of Nicaragua, Sr George de la Barra, first secretary of the Legation of Bolivia; Sr Aristides Bonilla, acting consul general of Costa Rica.

The executive committee for the model plane contest, in which some 89,000 Manual Training students of Greater New York will compete for 2,500 prizes includes Amelia Earhart, Lady Diana Heath, Clarence Chamberlain, Hon George J Ryan, Edward L Beckett, Dr Wm J O'Shea

The thousands of models will be on exhibition on the third floor of the Grand Palace, along with educational features, booths of flying schools, and aeronautical publications The second floor will be devoted to exhibits of transport companies, airport engineering, and equipment, hangar equipment, dope, fabrics and flying togs The main floor of the Palace will be devoted almost exclusively to the exhibition of the planes themselves, although a number of accessory booths will be interspersed

Plans Coast-to-Coast Non-Stop Round Trip

WICHITA, KAN —H F Mitchell, nephew of Col William Mitchell former chief of the Army air service, and general manager of Pacific Southwest Airways of Wichita, has signed a contract which calls for the first round trip, non-stop transcontinental flight from ocean to ocean on record He is to leave Roosevelt Field, L I, on March 3 and reaching San Francisco is to circle the field and head back for New York.

Mitchell holds fuel and load requirements and specifications for a plane which is to be built at a cost of at least $20,000 The contract will be let on competitive bids There are said to be several thousand dollars in prizes for the competition of such a flight.

Stearman Agency for Hawaii

OAKLAND, CALIF —Sam Metzger of the Metro service has gone to Hawaii where he will establish a branch agency for Steaeman planes The Metro service has just received a new Whirlwind Stearman and has two more ordered.

Test Kinner American Eagle

KANSAS CITY, KAN.—Satisfactory tests of a Kinner radial engine powered American Eagle biplane have been completed at Fairfax Airport Larry D Rich piloted the plane

Gisholt Reports Large 1928 Gain

MADISON, WIS —The Gisholt Machine Co of this city, manufacturer of machines employed in the making of airplane power plants, has increased its business 85 per cent. this year over last, according to W. J. Hannun, sales manager of the concern. The firm, whose products are sold to leading engine companies employed 575 persons at the beginning of 1927 with a payroll of approximately $90,000 In December the company was employing 860 with a payroll of $130,000. The bulk of the business is reported to be domestic with about 12 per cent. in foreign orders.

Martin to Build Main Factory at Baltimore

BALTIMORE, MD.—Glenn L Martin has now definitely decided to transfer his entire airplane business to Baltimore, according to a statement to the Mayor of the city. The announcement culminates long negotiations between the city and Mr. Martin The plant will be located adjacent to the municipal airport and thus all controversy over leasing airport space has been done away with

Plans for the proposed factory have already been drawn up and contract bids are being received The plant, it is said, will be the largest on the Atlantic seaboard An experimental station in Canton is being opened and will serve Mr Martin's purposes until the new plant is completed, probably this spring

It is expected that other plane manufacturers will locate here shortly

Form M. U. Glider Unit

ANN ARBOR MICH.—A gliding unit has been organized by the Aeronautical Society of the University of Michigan, and it is expected that a primary training glider will be purchased in the spring with which preliminary instruction will be given

The Society has sponsored many balloon trips in the past and has been well supported by its members It is expected that gliding will receive even more enthusiasm on the campus

Associated Aircraft to Move

LOS ANGELES, CALIF —Following the recent dedication of the Los Angeles Metropolitan Airport, E S Pilsbury, 2nd, president of Associated Aircraft, Inc, has announced that his company will transfer the major portion of its operations and flying school to the new airport

The Associated Aircraft, Inc., owns the Eagle Airport in the San Fernando Valley

Mendez Reaches Goal After Repairing Plane

NEW YORK, N Y —Piloting his Curtiss Falcon, the Ricaurte, Lieut Benjamin Mendez finished his New York-to-Colombia flight on December 30 when he landed at Girardot on December 30, according to press reports received here.

Lieutenant Mendez, who received his aeronautical training in the United States, started the flight from Rockaway Beach on November 22, and hoped to cover the distance to Colombia in five hops but was delayed when his plane was damaged in landing on Colon Bay, Panama.

The use of a tri-engined amphibian plane to complete his flight was offered by the United States Government but Lieutenant Mendoz elected to wait until repairs could be made on the Ricarte, which plane had been purchased for him through popular subscription by his countrymen.

The flight from Colon to Girardot was made in two hops, the first one of 450 mi being to Cartagena, Colombia, which is about 500 mi north of Girardot

Wilkins Flight Clears Geographical Mystery

NEW YORK, N Y —Word received here by representatives of Sir Hubert Wilkins, who is now in the Antarctic, indicates that the noted explorer believes that he has cleared one of the mysteries that has long puzzled geographers, by a long and perilous flight in his Lockheed Whirlwind powered monoplane, San Francisco

The flight, which enabled him to see the country 650 mi. south of the base at Deception Island, convinced the explorer that Graham Land is not, as has long been supposed, a part of the great Polar continent but is separated from this body by an ice-filled channel.

Lieu. Carl B Eielson piloted the plane on the 1200 mi trip, and reported that it functioned perfectly A plane with wheels was used, efforts to take off with a seaplane on the previous day having proven unsuccessful after several attempts

Builds Stearman For Dual Utility

WICHITA, KAN —The Stearman Aircraft Co of Wichita is now developing a combination passenger and mail plane, to be powered with the Cyclone engine. The plane will carry four passengers and a pilot and have a mail compartment of 44 cu. ft. They will be constructed in such a way that they may be converted easily into mail planes of 100 cu. ft capacity. Three of the new craft are being built for the Robertson Air Lines of St. Louis

Van Lear Black Plans New Flights for 1929

BALTIMORE, MD —Van Lear Black of this city has announced his aeronautical plans for 1929.

The flier will resume his London to Capetown trip which was halted at Khartoum, and after returning to London he will fly to Japan by way of Bagdad and Bangkok. Then, if possible, he will proceed across Siberia, otherwise he will return to London on the same route. The plane will then be shipped to Baltimore, after which numerous flights will be made in the United States, with Baltimore as a terminal

John G Schotte and G J Geisendorffer will pilot the tri-engined Fokker on this venture in commercial pioneering, and Albert Weber will be the mechanic.

Mr Black has flown nearly 100,000 mi He was decorated by Queen Wilhelmina of Holland on completion of his Amsterdam to Batavia flight

Pitcairn's Autogiro Flown

PHILADELPHIA, PA —Harold F Pitcairn of Pitcairn Aviation, Inc, Philadelphia, has imported an Autogiro from Europe, and successful flight tests have been completed at Pitcairn Field. The plane is about 35 ft from tip to tip, and the "windmill" is about 25 ft in diameter

One of the two Lockheed Vega monoplanes in which Capt Sir Hubert Wilkins is exploring the Antarctic continent

Skies of North Pacific Charted

January Issue First of Series Hydrographic Office Will Publish

WASHINGTON, D C.—First of a series, the "Pilot Chart of the Upper Air for the North Pacific" for January, based on information from seven coastal stations and island stations of Manila, Guam and Honolulu, has been published by the Hydrographic Office of the Navy

It is expected to issue these charts monthly, and the compilers intend to avail themselves of every possible source of information to make it as complete as possible, in order that in the future, when trans-Pacific flights may be practicable, these charts will have the same value as the pilot charts now issued to mariners by the Hydrographic Office Due to the vast ocean areas covered by this chart and the scarcity of weather observation data, the information on atmospheric conditions at varying altitudes is now very meagre, but it is believed that the publication of this chart will stimulate interest in this work and that future editions will contain more details on air conditions.

Working On Coastal Chart

This chart, like its forerunner, the "Pilot Chart of the Upper Air for the North Atlantic," will be issued monthly for at least a year Then dependent upon atmospheric conditions, it will be decided whether or not to change the length of the period covered by each issue

No recommendations for trans-oceanic routes are made.

On the chart are shown wind diagrams at the altitudes of 10000 feet, 5000 feet, 2,500 feet and at sea level for the areas in the vicinity of the ten meterological stations from which data was obtainable Manila, Guam, Pearl Harbor, Seattle, Medford, San Francisco, Los Angeles San Diego, Coco Solo, Canal Zone, and Hong Kong

Information for the assistance of the aviator is published on the reverse of the chart and this includes a chart showing the location of weather broadcasting stations on both coasts of the Pacific

For coastal flights, the Hydrographic Office is working on a program of aviation charts showing flying routes from Juneau, Alaska, to Panama.

Three Cessnas Delivered

WICHITA KAN —Three deliveries on new planes are announced by the Cessna Aircraft Co One Warner powered plane went to Morrison Morrison, Cessna dealer of Los Angeles, a Whirlwind powered craft went to the firm's agent at Jacksonville, Fla, and a similar plane was delivered to Egyptian Airways, representative at Marion, Ill.

Try New Design In "Scout" Plane

Successful Tests are Conducted On Plywood Low-Wing Monoplane

SANTA ANA, CALIF—Satisfactory test flights of the "Scout" monoplane were conducted at the Eddie Martin Airport Santa Ana, Calif, December 27 Particular interest attaches to these flights because of the Scout's unusual design It is an all plywood, low wing monoplane, with monocoque fuselage and a wing containing no internal bracing except at the center section. Neither spars nor ribs are incorporated in the wing design, the entire strength being in the wing surface itself which is formed of plywood built up from bass wood veneer 1/16 m thick The thickness of the wing surface varies from 3/16 in to 2½ in, according to the stresses, while the fuselage is ½ in average thickness

Jimmie Angel flew the plane on its first test taking off quickly and circling the field many times to demonstrate the speed and maneuverability of the plane, as well as its balance and stability Excellent climb was demonstrated, an air speed in excess of 140 m p h was reached on less than half throttle and the plane landed at about 40 m p h with a 250 ft run

Developing New Engine

A sharply tapered wing is used on the Scout, span being 36 ft and maximum chord 12 ft with the chord at the tip 5½ ft. The Gottingen 387 curve, modified, is used at the root and the Clark Y at the tip of the wing, which has a total surface of 260 sq ft Length of the plane is 29 ft. overall maximum chord of stabilizer 16 ft and area of the stabilizer and one piece elevator together 48 sq ft, with a rudder area of 7 sq ft. The weight of the three place Scout is 1 900 lb Although the plane was test flown with a 300 hp Hisso it is said that a new engine developed by M C Tunison now nearing completion will be used to power the production models

The Scout was designed by M. C. Tunison, and constructed under his supervision. Many interesting processes have been developed for forming the one piece top and bottom plates of the wing which, when placed together and secured form an essentially one piece wing hollow inside and with sufficient room for a man to crawl from tip to tip

Early quantity production is planned on airplanes of this type of structure, with the probability that the factory will be located in Los Angeles, or in Fullerton where the first plane was built A syndicate of Los Angeles business men headed by Thomas M Bridges and Forrest Johnson are backing the development.

The landing wheels are carried completely inside individual plywood structures of streamline form

Announce Three New Companies

NEW YORK, N Y—Reports of three new incorporations have been received as follows: The T-L-C Aircraft Co has been chartered in Charlotte, N. C., with a capital stock of $25,000 by Paul E Thomason, 502 Roswell Avenue, and others. The Portland Airplane Corp has been formed in Portland, Ore., by K. Miller, E. H Mason, and A G. Fletcher, and Mahon Air Transport, Inc., has been chartered in Williamsburg, Ky., by J C Mahon and others

Eaglerock Prize Won By Coast Distributor

COLORADO SPRINGS, COLO—A $300 first prize and free trip to Colorado Springs for the Eaglerock distributors convention January 14, 15 and 16 has been awarded by the Alexander Aircraft Co., to the Aero Corporation of California at Los Angeles The Aero Corporation was named most successful distributor in sales during 1928

The second prize of $200 was awarded Willis Kvsor, distributor for Michigan at Niles He also received a free trip The company furthermore, will defray expenses to the convention of the following distributors who tied for third J. Shelly Charles Richmond, Va ; Ray Kuhl, South Bend, Ind , Massachusetts Airways, Springfield, Mass , and Rapid Air Lines, Rapid City, S D

More than 25 distributors and many dealers will attend the meetings Pres. J. Don Alexander and Justin McInaney, sales manager, will preside

Raise Porterfield Tuition

KANSAS CITY, MO—Capt L A Miller, director of the Porterfield Flying School, Inc, of Kansas City, reports an increase in flying school tuition effective immediately The increase will amount to approximately $40 on each course, and will include hereafter the home study course "The addition of the home study course," says Captain Miller," makes our flying course much more efficient. Prospective students come to the school better equipped"

Fokker F-12 Ready in 90 Days

NEW YORK, N Y—Anthony H. G Fokker of the Fokker Aircraft Corporation of America announces that the first of the newly-designed 32 passenger four-engined Fokkers will be ready for test flights in approximately 90 days The F-12, as the plane will be designated will include berth accommodations. Five have been ordered by Universal Air Lines

Officers of Travel Air Now With Air Service

WICHITA, KAN—Officers and directors of the Travel Air and Swallow companies of Wichita have been admitted to membership in the Air Service Corp, holding company of several projected flying schools in various parts of the country The corporation capitalized for $100 000, has let the contract for a $15,000 hangar on Travel Air field

E A. Watkins, head of the Watkins Manufacturing Co, has been elected president of the new corporation Other officers include J H Turner of Travel Air, first vice-president; R. B Gile, Minneapolis, second vice-president; C E. Parr, Wichita manufacturer, treasurer and N G Warnsuske, Minneapolis secretary and general manager Directors include Walter Beech, president of Travel Air, W M Moore, president of Swallow, W R Snook Thad Carver and C G Yankey, Travel Air officers; John Kirkwood, president of the Wichita chamber of commerce; R D. W. Clapp Dr J. M Jones H W Strong G M Tilford, A P McCullough G A. McDonald, A L. Yelder and Frank Priets, Wichita and Minneapolis business and professional men.

Branch schools of the corporation are now in service at St Paul and Minneapolis with plans calling for others to be located in the cities scattered over the country where the Watkins company has branch factories

Buy Spokane Airways Planes and Equipment

SPOKANE, WASH—Announcement of the purchase of hangars, planes and equipment of the Spokane Airways by the Yellow Air Lines is made here George C Nichols and A. H. Wenck, both of whom are officials of the Yellow Cab Co., are president and director, respectively A E Rice is secretary-treasurer

Planes include some Curtiss-Robin monoplanes hangar space for six planes, shop and office Plans call for taxicab service to and from the field and retailing of Robins C. H Griffin, western sales manager for the Curtiss Flying Service, was in Spokane to assist the new company in completing the work of organization.

Berry Brothers Vote New Unit

DETROIT, MICH.—The board of directors of Berry Brothers, Inc., has now approved immediate expansion of the firm's aviation division, including the erection of a new factory unit for the production of aircraft finishes. The new unit, scheduled for completion by spring, will relieve the burden on present facilities taxed by the increased demand for dopes, lacquers, and finishes.

Complete Test Flights On New Bach 10 Place

LOS ANGELES, CALIF—Newest product of the Bach factories test flights have recently been completed on the first Bach 10 place transport plane for the Pickwick Air Lines Powered with a Pratt & Whitney "Hornet" engine of 525 hp. in the nose, and a 150 hp 7 cinder "Comet" engine under each wing, the new Bach shows quick takeoff, fast climb, and a cruising speed in excess of 125 m p h

The new Bach is luxuriously fitted with wicker chairs deeply cushioned and tapestry covered, a full length couch, separate smoking compartment, completely equipped lavatory, and a baggage compartment reached from inside or outside the fuselage Interior finish is in polished natural grain woods with silver plated fitting on door hinges, handles, window latches and exposed plumbing All windows are of sliding plate glass and dome lights are provided in all compartments for night flying

This Barh plane is said to be the first of a unit of 10 on order with the Bach factory by Pickwick Air Lines for service over Los Angeles-San Francisco, and Los Angeles-Chicago air lines

Moreland Will Erect Plant at Los Angeles

LOS ANGELES, CALIF—Announcement has recently been made of the incorporation of the Moreland Aircraft, Inc, here with an initial working capital of $500 000 Morriand Aircraft officials have acquired eleven acres of land adjacent to the Los Angeles Municipal Airport at Mines Field, and are planning the immediate erection of a factory building 80 by 200 ft. in size.

Initial plans call for the production of a three place open cockpit monoplane of high wing type The plant has been designed for installation of any new production radial engine from 150 to 250 hp With a 150 hp engine its performance is said to range from 40 m p h landing speed to 130 m h.p. top speed.

The Moreland Aircraft Inc., is a closed corporation with G. E. Moreland as president and general manager, and as directors, William Lacy, president of the Lacy Manufacturing Co , W W. Wilson, vice president and general manager of the Wilson Oil Tools Corp., and C. J. Wild, president of the Warman Steel Casting Co, all of Los Angeles

Schmid Gives Aero Lectures

ST LOUIS, MO—Lieut Edgar Schmid, adjutant of the 35th Division Air Service and flying instructor in Parks Air College, has begun a speaking program before various civic an dother organizations on the subject of commercial aviation. He has recently addressed Optimists and Kewanis clubs, the University City High School Aviation Club, the St Louis Y M C A., and the Cahokia Lumber Men's Association

Dusting by Plane Kills Mosquitoes

WASHINGTON D C—Eradication of mosquitoes by the dusting of a Paris Green and soapstone preparation with a sperial apparatus installed on Marine Corps planes, stationed at the various bases in Nicaragua, is announcad by Marine Corps headquarters.

The method, which destroys the mosquito larvae, has been developed during the past two years by public health officers, using Marine Corps planes in experiments at Quantico

Nebraskans to Confer On Aeronautical Code

OMAHA NEB—A state-wide aviation conference under the auspices of the Omaha chapter of the National Aeronautical Association, will be held in Omaha about the middle of January to frame a code of aviation laws to present to the next session of the legislature.

A H Fetters president of the Omaha chapter, has been authorized to appoint a committee to call the conference at which every owner of airrraft and everyone interested in aviation in the state of Nebraska is invited to be present

The main purpose of the Aeronautical association's legislative program is to secure state regulation of commerrial aviation, and on exemption from the state gasoline tax on gasoline used for aviation purposes

Booklet on Bohnalite Tells Alloy Process

DETROIT, MICH—Progress and process of Bohnalite, the light alloy developed by Charles B Bohn, president of the Bohn Aluminum & Brass Corp , this city, is described in a booklet which has been issued by the firm Many Bohnalite pieces, ranging from 11 ft dirigible crankcases to small bearing caps, are shown in the publication

The company states that among a large number of firms using Bohnalite are many companies of the aircraft industry High and uniform hardness great density, fine grained structure, lightness, strength, and ductility are claimed for the metal.

Mrs. Thaden Used Champions

TOLEDO, O—Mrs. Louise McPhetridge Thaden, recently credited with an altitude mark of better than 20 000 ft. in a flight at San Francisco, used Champion spark plugs in the Hisso powered Travel Air Model 3000 used in the climb, according to a report at the Champion company here

Arrange Meeting On Standardizing

Aeronautical Industry is Urged To Attend Army-Navy Conference

PHILADELPHIA, PA—Attendance of representatives of the aeronautical and related industries at the fifth annual Army-Navy Conference for the standardization of aeronautical instruments and parts, to be held at the Naval Aircraft Factory here during the week beginning February 11, is urged by the officers in charge, in order that the decisions may be correlated with the latest commercial practices

An agenda of the topics to be treated is available upon request. The significance of the conference to the industry as well as the raw material and commercial parts supplies is indicated by items listed in the agenda. The ultimate success of the standardization attempt, will depend largely, those in charge declare, on the cooperation of the commercial industry

Advance information in the form of tentative drawings and specifications, agreed to in a preliminary conference between Army and Navy representatives, is being distributed Any industry which has not received this detailed information and which desires to participate in the conference may obtain this by addressing a request to Army-Navy Standards Conference care of Manager, Naval Aircraft Factory, Navy Yard, Philadelphia, Pa Organizations which cannot be represented but which desire to submit comment on the advance specifications are invited to do so.

The actual sessions of the conference will probably be divided into about four sub-groups, the time schedules of whose meetings will be announced in advance of the conference

Lockheed Production To Quadruple in 1929

BURBANK, CALIF.—Production of the Lockheed Aircraft Company in 1929 will total 200 planes compared with 50 which were built and placed in service during 1928 according to F. E Keeler, president. It was said that by January 1, new buildings would have been completed giving the Burbank factory an additional 10 000 sq. ft of floor space or a total of 48 000 sq ft. Thereafter the production schedule calls for at least 20 planes per month

The Schlee-Brock Corp of Detroit has contracted for five planes per month in 1929 for a total value of $750,000 and will distribute Lockheed products throughout the Central and Southern states In addition to the Schlee-Brock contract Mr Keeler stated that the Lockheed factory was six planes behind with orders for craft which were to be delivered during the month of December just closed

Personnel

HOWARD J. HEINDELL, technical demonstrator and service man, and Louis Pereny, aviation chemist, have been named to the Berry Brothers, Inc., aviation division to serve on the staff of T. B. Colby, manager. Mr. Heindell's services will be available to manufacturers desiring help in doping, covering, and finishing. Mr. Pereny, a graduate chemist of the University of Michigan, has focused his attentions upon the development of aircraft finished.

THOMAS W. WINK has been named second night superintendent at the Albany, N. Y., airport, according to an announcement by Lester W. Herzog, commissioner of public works.

JOE JAMES has returned to Albany Air Service as pilot. FRANK J. AMBROSE, reserve pilot for Canadian Colonial Airways, also is now flying for the Albany concern.

GEORGE A. SPECHT is now a member of the local traffic department of Universal Air Lines. He was formerly a Minneapolis attorney.

CHARLES D. STEARNS, Montreal district manager of Canadian Colonial Airways, has been appointed traffic manager for the entire line with headquarters at Montreal. Mr. Stearns was formerly with Colonial Air Transport at an assistant in the Boston office. From Boston he went to Schenectady, N. Y., to open the Colonial Western office in that city.

COL. FRED CARROWAY of New York City has been elected vice-president in charge of international affairs of the Alexander Aircraft Co., Colorado Springs. The company now has sales representatives in Canada, Mexico, and Alaska and is receiving inquiries from many South American automobile firms relative to dealerships.

P. M. KINYANON has succeeded ROBERT GAST as general manager of Cardinal Fliers, Bowman Field, Louisville. Mr. Gast is now private pilot for John Hertz, Chicago millionaire.

CHARLES SCHMIDT of Merrill, Wis., has been named by the Mosinee Airport Co. as manager and chief pilot of the Mosinee, Wis., airport.

JESS I. MENEFEE, Kelly Field graduate now credited with a total of 3,500 hr., has become associated with Barrett Airways, Inc., of Armonk, Westchester County, N. Y. Mr. Menefee is an expert flying instructor, having trained some 900 students during the war.

CHARLES E. KIRK, formerly connected with the American School, Chicago, has joined the staff of the National Aviation School of Louisville, Ky.

M. E. HULSE of the Consolidated Instruments Co., New York City, has been appointed western sales manager for the company and will maintain headquarters at Wichita, Kans., and Oakland, Calif.

LIEUT. DANIEL W. TOMLINSON, U. S. N., one of the "Sea Hawks," has resigned his commission, according to reports, to become vice-president and general manager of Maddux Air Lines. The lieutenant has been chief test pilot at the naval air base at Anacostia for the last three months.

LIEUT. ALBERT B. WUNDER, U. S. Infantry, has been appointed to the position of assistant superintendent at Cincinnati's municipal airport, according to an announcement by C. O. Sherrill, city manager. Lieutenant Wunder has for some time been active in aeronautics in the Cincinnati section.

Parks Reports 408 Enrolment

ST. LOUIS, MO.—The total enrolment of the Parks Air College flying and mechanics' schools based on reports for December 20, is 408 students, according to Harry P. Mammen, president. Of these, 231 are in the flying school, and 177 are in the mechanics' school. Since the opening of the institution last March approximately 100 students have qualified as Limited Commercial Pilots, and several are now Transport pilots. Several graduates of the school are included in the list of 27 pilots enrolled for the night flying course which begins in March.

Contracts for Five Stearmans

WICHITA, KAN.—Earl Shaeffer, sales manager for the Stearman company, has just closed a contract with A. S. Hanford, Inc., of Sioux City, Ia., for the purchase of five Whirlwind biplanes. The first of the order has been delivered. It was the company's Chicago show plane. The Hanford company will represent Stearman at Sioux City.

Plan Memorial to Dole Fliers

OAKLAND, CALIF.—A two-story building to be shaped like an airplane and to house a museum of aeronautics as well as art objects will be erected here as a memorial to the fliers who lost their lives in the Dole flight to Hawaii. The cost to approximate $500,000, is to be defrayed by popular subscription, it is reported.

Mamer Buys Ford Plane

SPOKANE, WASH.—Purchase of a new tri-engined Ford plane is announced by the Mamer Flying Service of Spokane. It will to be powered with three of the new series Wright 300 hp. engines. Delivery is to be made shortly after March 1.

Announce Directorate Of Aeronautical Corp.

NEW YORK, N. Y.—Officers and directors of the Aeronautical Corp. of America, organized here to manufacture the Italian Savoia-Marchetti amphibian plane, have been announced by Anea Bossi, who was largely instrumental in organizing the company and securing Premier Mussolini's permission for the project.

Mr. Bossi, former Italian pilot and now an American citizen, will head the concern. A. Kaptyn, formerly of the Westinghouse Company will be secretary. The directing board also includes: Frederick A. Stevenson, acting vice president of the American Car and Foundry Co.; Kenneth M. Spence of Spence, Hopkins and Walser; and Ugo d'Annunzio, son of the Italian poet.

Three subsidiaries of the company have been formed: American Aeronautical Sales Corp. of which d'Annunzio is president, United States Air Service, and the Seaplane and Amphibian School Corp.

Six of the Savoia-Marchetti planes are being imported for exhibition purposes and will reach this country early in January.

Finds Twist Weakens Girders for Airships

WASHINGTON, D. C.—Investigations by the Bureau of Standards shows that strength of longitudinal girders for dirigibles is increased 50 per cent if these members are kept from twisting, the stress at failure of the untwisted members being found to approximate the yield point of the material showing that its full strength was utilized. Tests are being made here in cooperation with the Bureau of Aeronautics, Navy Department.

It has been customary to use sheet duralumin formed into a channel for longitudinal members. It seems evident that the use of members having higher torsional rigidity is desirable and this can be accomplished by using tubes instead of channel. In the form of a tube a given amount of material has greater torsional strength than in any other form but if tubes having thin walls are to be used for airships, the question of corrosion on the inside of the tubes where inspection is impossible must be carefully considered.

Ask Space at Twin City Show

MINNEAPOLIS, MINN.—Plans are under way here for holding an airplane show in connection with the Twin City Automobile show, to be held February 2 to 9. Officials in charge of the auto show report many requests for space from airplane dealers and manufacturers.

Ames Named Representative

BOSTON, MASS.—F. L. Ames of this city, a well-known yachtsman, has been named Travel Air representative in the New England states. He is director of the Boston Airways Corp.

Reviews

The Book Department, Aviation, 250 West 57th the National Advisory Committee for Aeronautics, St., New York City, can supply all books mentioned except governmental publications. N.A.C.A. publications may be obtained upon request from Washington, D. C.

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The Art of Flying is the first book to be written by Capt. Norman Macmillan, M. C., A. F. C., well-known British aviator. In it, the author gives the solutions to many problems encountered by the pilot, which ordinarily are learned only by experience and cannot be covered in an ordinary flight instruction course. While the book has been written primarily for pilots, the author has avoided technicalities in an effort to enlarge its appeal, for as he says in the introduction, "the wider its appeal the greater will be its value." The book discusses "ground thinking," the sense of hearing, the flying sense, the water element in seaplane flying, types of aircraft, details in design, speed ranges, the human factor and test flying. The price is $1.75.

* * *

If You Want to Fly is the title of a new boy's book on aviation by Prof. Alexander Klemin, head of the Daniel Guggenheim School of Aeronautics at New York University. The book, which has just been placed on the market, is written in narrative form. It is the story of "Peter Jones" who becomes his uncle's assistant in the operation of a private aviation service. From his uncle, who originally learned to fly in the World War, Peter obtains a practical knowledge of aerodynamics, aircraft engines, the structure and rigging of airplanes and of the business side of aeronautics. In addition, he learns to fly. The book is highly instructive, and since the information it contains in given in the form of a narrative, it is believed that it should be quite popular with boys. The price is $2.50.

To Start Commercial Firm Plant

LOS ANGELES, CALIF.—Construction is soon to start upon the first unit of a $250,000 factory being erected at the Los Angeles Metropolitan Airport by the Commercial Aircraft Co. of Wichita, Kan., according to company officials. It is said that the factory program will require approximately 18 months for its completion. A six place biplane of cabin type is planned for quantity production upon the completion of the first factory unit.

Black and Decker Will Build

TOWSON, MD.—Officers of the Black & Decker Manufacturing Co., electric tool firm, have been authorized by the board of directors to erect a new factory building here. With business increasing in volume, the new plant will add a needed 40,000 sq. ft. of floor space to present facilities. Work on the structure is to begin early this month.

Hankow Firm Seeks Pilot

KANSAS CITY, KAN.—A request that he recommend a graduate of the Porterfield Flying School to go to China and demonstrate American Eagle planes there has been received by E. E. Porterfield, Jr., American Eagle firm president, from L. E. Gale and Co. of Hankow. The Oriental company has orderrd 12 American Eagles, powered with Kinner radial engines.

Los Angeles Chamber Adds Aero Department

LOS ANGELES, CALIF.—An aviation department of the Los Angeles Chamber of Commerce has been formed under the direction of H. H. Crites. This new department will be devoted exclusively to developing aviation industries in Southern California and will attempt to cooperate with any aircraft organization in the country in solving manufacturing or operating problems relative to locating in Southern California.

The Los Angeles Chamber of Commerce has assisted aviation projects for a number of years through the aeronautical and meterological department headed by Dr. Ford A. Carpenter, and also through H. R. Brashear, traffic expert, but this is the first time that a separate department has been sponsored solely for serving the aviation trade.

Book on Air Industry Published by Pynchon

NEW YORK, N. Y.—"The Aviation Industry" is the title of a 74 page book compiled here by Pynchon & Co. in collaboration with Black & Bigelow, Inc., air transport engineers. The book presents a brief review of the development of aviation in the United States, and gives tabulated statistics of air mail and other flying operations as well as reviews of the work of many operators and manufacturers of aircraft, engines, and accessories.

The book also gives a summary of the present-day status of aviation, with notes on airplane and engine production, an index of transport and miscellaneous companies connected with the industry, and provides a map of the principal air mail routes.

Name Simpson Avian Agent

HOLLYWOOD, CALIF.—Dealership for the Avro Avian plane in Southern California has been awarded to Russell Simpson, Hollywood, by Air Associates, Inc., of New York City. Mr. Simpson has recently purchased two more Avian planes, bringing his total to three.

Form Dallas Insurance Firm

DALLAS, TEX.—The incorporation here of the Air Traveler Insurance Co. by George B. Grogan and Thomas E. Campbell has been announced.

Trade Tips

It Has Been Reported that

—Albert J. Wadel at Oakland, Calif., plans to purchase a plane as soon as his course in flying is completed. He will use the plane for inspecting his father's plantation holdings in San Salvador.

—Williams Flying Service, Inc., Greenville, N. C., of which Errett Williams is manager, will erect an airplane repair shop at the municipal airport, and expects ultimately to manufacture planes there.

—Construction of a hangar and airport on a 120 acre tract is planned by the Kitty Hawk Aviation, Yacht & Hunt Club of North Carolina, New Bern, N. C. T. P. Magruder, 1623 H Street, Washington, D. C., is president.

—New equipment necessary for increased plane production is to be added by the Bird Wing Commercial Aircraft Co., St. Joseph, Mo. Work will begin on the erection of the firm's new plant next May. It will be 100 by 200 ft.

—Adolph Nelson and others are having plans prepared for the construction of a hangar at Ford airport, Iron Mountain, Mich.

—The Commercial Club of Williston, N. D., is to construct a hangar at the local airport, which has been leased to E. M. Canfield.

—Western Air Lines, Sebastopol, Calif., of which Fred Speckman is president, will erect a shop building. This will be maintained in connection with a flying school which Mr. Speckman will establish.

Adapt Collegiates for Cameras

Three recent sales of Timm "Collegiate" monoplanes for photography and aerial mapping work are reported by Jack Gardner, of the Otto Timm Airplane Corporation. Slight alterations were made in the front cockpit to accommodate the camera installation.

Orders 25 Command-Aires

LOS ANGELES, CALIF.—Announcement has been made in Los Angeles of the purchase of 25 Command-Aire biplanes by Herbert R. Miller. The deal is said to involve in excess of $75,000 with delivery scheduled for the early spring months of 1929.

U. W. May Teach Aeronautics

MADISON, WIS.—According to an announcement by F. E. Turneaure, dean of the University of Wisconsin college of engineering, an aeronautics course will be taught if the legislature allows an item in the university's budget for 1929-31.

AIRPORTS AND AIRLINES

Buy Land for $10,000,000 Field to Serve New York

Industry Evinces Interest in 220 Acre Terminal Planned by E. H. Holmes & Co.

NEW YORK, N Y —Purchase of a 220 acre tract of land, 20 min from the heart of New York City, at a cost of $5,000 000 for the purpose of establishing a $10,000,000 private airport is announced by E H. Holmes & Co, investment bankers of 60 Wall Street

Construction will be undertaken at once, under the direction of Black and Bigelow, Inc, air transportation engineers Present plans call for the completion of two runways, offering takeoff facilities in four directions by early Spring and completion of construction work late this year

The property, which consists of 2 000 lots is located in Queens County, just west of Jackson Heights, lying between Northern Boulevard and Astoria Avenue

The new airport will be equipped with hangars, traffic towers, lighting facilities restaurants show rooms, waiting rooms, and the passenger accommodations usually provided by modern railroad terminals Income producing revenue will include leasehold rentals from air mail freight and passenger transport companies, landing fees from owners of private planes sight seeing trips, hangar rentals, aviation meets, storage fees, oil and gasoline sales and service work as well as additional revenues to be derived from the operation of restaurants and other concessions similar to the facilities in railroad terminals

The interest which the aviation industry is taking in the Holmes airport is shown by the fact that communications of inquiry have already been received from representatives of the Bellenca Aircraft Corp., Alexander Aircraft Co, Moth Aircraft Corp Cessna Airplane Co American Eagle Aircraft Corp., United States Air Transport Colonial Airways, and Swallow Aircraft Corp

On Main Thoroughfare

The tract is declared to be closer to the heart of New York City than the Croyden Field is to Loudon or Le Bourget to Paris Direct access to the field is had via the Queensborough Bridge, several subway lines and the Long Island Railroad The proposed Tri-borough Bridge will terminate near the airport while access to uptown New York and Westchester is via the Ninety-first Street and College Point Ferries Northern Boulevard, marking the southern boundary of the airport is the main automobile road to and from the residential section of the North Shore of Long Island.

E. H Holmes & Co. have been actively identified with the financing of expansion requirements of several leading companies in the aircraft industry, including Swallow Airplane Co, Heywood Starter Co., and Cessna Airplane Co

Colonial Constructing Big Hangar at Albany

ALBANY, N Y—Construction of a $75,000 hangar at the Albany airport has been started by Colonial Western Airways and Canadian Colonial Airways W Shelton Swallow, construction engineer retained by the airways concern, is supervising the work

The building will be of brick and steel construction, 120 ft. sq., and will provide accommodation for 20 planes A two story ornamental, wing will contain a manager's office, a waiting room, a machine shop and stock room, living quarters for members of the operating personnel a class room, and various other accommodations

The hangar is the third to be erected on the Albany airport since its opening six months ago The other two hangars were built by the city and leased to individual operators desiring facilities at Albany

Announce Plans For 28 Airports

WASHINGTON, D. C.—Plans for the construction of municipal airports are announced by 28 more cities, according to a report by the Aeronautics Branch. The cities are as follows

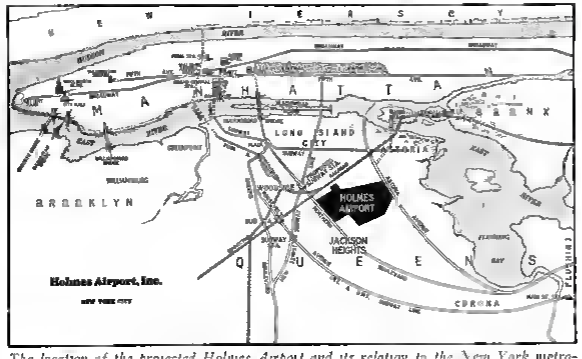
Carlinville, Ill.; Downers Grove, Ill.; Hutchinson, Kan., Paducah, Ky.; Marlboro, Mass., Detroit, Mich.; Wayne, Mich.; Columbus, Miss.; Norfolk, Neb.; Cohoes, N Y.; Valley City, N. D.; Put-in-Bay, O., Eureka Springs, Okla., Shawnee, Okla.; Arlington, Ore.; Scappoose, Ore.; Stroudsburg, Pa.; Jackson Tenn.; Ilwaco, Wash.; Tacoma (Pierce County), Wash.; Jelleo, Tenn.; Bonham, Tex.; Jefferson, Tex., Kerrville, Tex., Longview, Tex.; Paris, Tex., Tulia, Tex.; and Tyler, Tex.

Interstate Names Ticket Agent

LOUISVILLE, KY.—Appointment of the Travel Department of the Liberty Bank and Trust Co., this city, as its passenger agent has been announced by the Interstate Airlines, Inc, which offers service to St Louis, Chicago, Atlanta, and intermediate points. The Travel Department will provide information on rates schedules and other relative matters

Rhode Island to Own Field

PROVIDENCE, R. I.—Announcement is made that the State of Rhode Island has voted approval of a $300,000 bond issue for a state-owned airport.



The location of the projected Holmes Airport and its relation to the New York metropolitan area is indicated by the above map

Mail Day at Louisville Proposed This Month

LOUISVILLE, KY—An air mail day is proposed here for some time in January, according to Addison W Lee, president of the Louisville and Jefferson County Air Board, who announces a conference is to be held with officials of Coutinental Airlines to consider the proposal.

The purpose of the Air Mail Day would be to increase popular interest in the proposed extension of the Cleveland-Louisville route into a direct southern trans continental air route to be used when weather conditions along the northern route are unfavorable. It would pass through Memphis and Little Rock, and at Dallas would connect with the line to Los Angeles

Under this proposal Louisville would become the key city in the east and would be a central loading station for air mail going to the southern and middle western states

Standard Oil Official Charts Service Route

NEW ORLEANS, LA—T H Taylor, general sales manager, and R. H Pennebaker, lubricating engineer, of the Standard Oil Co. of Louisiana, recently returned to New Orleans in the company's new Buhl Airsedan after making plans in four states for their organization's commercial air service. The executives were piloted on their 1,400 mi journey over Louisiana, Mississippi, Arkansas, and Tennessee by Don Rice

Visiting Monroe, Shreveport, Little Rock, Pine Bluff, Memphis, Nashville, and Chattanooga, Mr Taylor and Mr Pennebaker made notations on conditions of landing fields and logged flying time between some of the cities served by the Standard Oil Co. of Louisiana

Information obtained on the trip will be filed for use by executives of the company in employing the new plane to expedite service and save time for the organization's representative

Milwaukee Green Bay Fares Are Announced

MILWAUKEE, WIS — Passenger fares featuring a dollar additional charge for each succeeding city are announced for the newly-opened Milwaukee Green Bay, Wis., run operated by Northwest Airways The tariff from Milwaukee to Fond du Lac the first city on the route, is $12, to Oshkosh $13, to Appleton, $14, and to Green Bay, $15

The first run on December 15 was made by Charles "Speed" Holman, chief pilot for Northwest, with better than 199 lb. of mail matter. The backing of the Milwauken Association of Commerce figured in the establishment of the route, two meetings of the various city representatives and postmasters along the airway having been called,

Air Mail Poundage Doubled During the Christmas Rush

Yule Loads Nearly Quadruple Those of 1926; Various Cities Report Traffic

WASHINGTON, D C—Transportation of Christmas gifts and greetings by air mail during the recent holiday period resulted in more than double the poundage handled in the 1927 Yule period, which in turn was nearly double that for 1926, according to figures made public by Postmaster General New on westbound mailings out of Chicago and eastbound mailings out of Salt Lake City for December 15-25. For this period in 1926 the westbound poundage out of Chicago was 5,563 In 1927 it was 11,206, and in 1928 it was 22,616 lb Eastbound out of Salt Lake City in 1926 the poundage was 5 333 In 1927, it was 10,489, and in 1928, 26,199 Indicative reports from several towns follow.

OAKLAND, CALIF—Previous records for air mail poundage at Oakland Municipal Airport were broken during the Christmas season just ended

So great was the use of the air mail by the general public that the large trienghued Boeing biplanes, which were not scheduled to be put into operations before the first of the year, were pressed into service. The greatest load of mail, 1,248 lb, was carried out of Oakland, December 21

Eastbound air mail figures for the week preceding Christmas were December 16, 617 lb , December 17, 170 lb , December 18, 813 lb., December 19, 981 lb., December 20, 1,152 lb , December 21, 1,248 lb , and December 22, 1,220 lb

LOS ANGELES, CALIF—New records for air mail loads out of Los Angeles were established on three successive days during the week before Christmas On Tuesday, Wednesday and Thursday it was necessary to use two Fokker F-10 triengined planes to handle the loads going east over the Western Air Express route to Salt Lake City. Approximately 64,000 pieces of mail were carried on Tuesday, 78,240 pieces on Wednesday, and more than 91,000 pieces an all time record for this route and the high mark of the 1928 Christmas rush, on Thursday

OMAHA, NEB.—Where one plane left Omaha for the east and another for the west in normal times, three and four were used on the transcontinental through here during the Christmas period The aircraft carried 1,600 to 1,800 lb of mail each trip

Planes of U. S. Flew 58,000,000 Mi. in 1928

WASHINGTON, D C—Such strides were made in aeronautics in 1928 that the close of the year finds commercial planes flying daily over 36 states with daily calls at 108 cities. Mail planes alone flew 7 200,000 mi with 1,700 tons of mail, 30,000 express packages, and hundreds of passengers

Col Paul Henderson, president of the American Air Transport Association, has announced that in 1928 commercial and military planes in the United States flew 58,000,000 mi for air mail, express, passenger, and civil flying.

The Government is rapidly adding to the lighted airways and there are now 8,000 mi over which the mail and passenger planes shuttle back and forth with notable improvement in weather forecasts and radio equipment

The production of airplanes by plants in this country totals about 4,000 planes and the capital investment in commercial aeronautics exceeds $100,000,000

Baton Rouge Chooses Site for New Airport

BATON ROUGE, LA—The Goodwood site, four and a half miles south of this city, has been chosen as the location for Batou Rouge's airport at a recent meeting of the Chamber of Commerce committee yesterday Petitions asking for an early election to approve taxes necessary for the field will now be circulated.

The chosen location was recently named by a Government airport specialist as number one of more than a dozen sites offered Recently the committee narrowed its choice to two the Goodwood and the Bailey, and asked the owners to submit revised prices

A total of $50 000 will be paid for the 20 acres in the Goodwood site This is at the rate of $250 an acre. The land will be selected by the committee from 400 acres available and will be cleared and surfaced-dramed by the owner

N. A. T. Pilot Lowers Record

CHICAGO, ILL.—A new record over the Kansas City-Chicago air mail route was established December 26 when Edmund "Mike" Matucha covered the 450 air miles from Kansas City to here in 2 hr 37 min. Matucha, a former Army pilot, has 3 600 hr to his credit. He made the flight in a new Curtiss Falcon

Select Field Site At New Orleans

To Incorporate A-I-A Airport in Plans for Development of Lake Shore

NEW ORLEANS, LA.—An A-1 A Airport with all necessary facilities will be established and maintained by the New Orleans levee board in connection with its proposed $30 000,000 Lake Pontchartrain development project according to announcements made at a recent meeting of the board.

Joseph Haspel, president, appointed a special committee to immediately begin an inquiry as to cost, revenue, layout net return on operations and all other information necessary to justify the board undertaking the venture proposed. The committee has been at work on the airport project for several weeks and has visited several large cities, collecting data on the subject.

The levee commissioners, by a unanimous vote decided to establish the proposed airport on a 2 500 ft. square adjacent to the Industrial Canal. Adoption of the special committee's report, which urged the levee board to establish the municipal airport, was also unanimous.

The special committee was composed of Charles J. Donner, executive secretary of the board; W. B. Davey, chief engineer, E. C. Hyatt, assistant engineer in charge of lakefront development, and Scott F. Assenheimer, superintendent of forces.

To Accommodate Seaplanes

The city authorities have long been working on a plan for extensive development of that part of the city and its suburbs which lies on the southern shore of Lake Pontchartrain. The new airport will not only have excellent land facilities, when improved, but will also allow landing space for seaplanes.

The establishment and maintainence of the new field will be under the jurisdiction of a committee of levee board members consisting of President Haspel as chairman and five other members whom he will appoint. The committee will be at all times assisted by the levee board's executive secretary, acting chief engineer, and the attorney of the legal department. All final actions are to be subject to the approval of the board as a body.

Vote $3500 for Imperial Field

IMPERIAL, CALIF.—Further improvement of the 160-acre Imperial Valley, Calif., airport was recently assured when the Imperial County Board of supervisors voted an additional $3,500 for use in developing the airport. Supervisor Ben Hulse, in charge of the work is experimenting with the use of oil on the sand runways, the ordinary treatment having proven inadequate to convert the Imperial Valley dessert sand into a hard, permanent runway.

Beacon Warns Of Power Line

ALBANY, N. Y.—The New York Power and Light Corporation has installed a Neon beacon on the high tension line just east of the Albany airport. It replaces a less powerful revolving beacon erected last summer.

The New York State Aviation Conference shortly will request all power companies in the state to mark their high tension lines in similar fashion.

Survey Winslow, Ariz., Field

WINSLOW, ARIZ.—Work of surveying a mile-square flying field was commenced here during the latter part of December, if present plans materialize Winslow will have a Triple A airport with all conveniences for passengers.

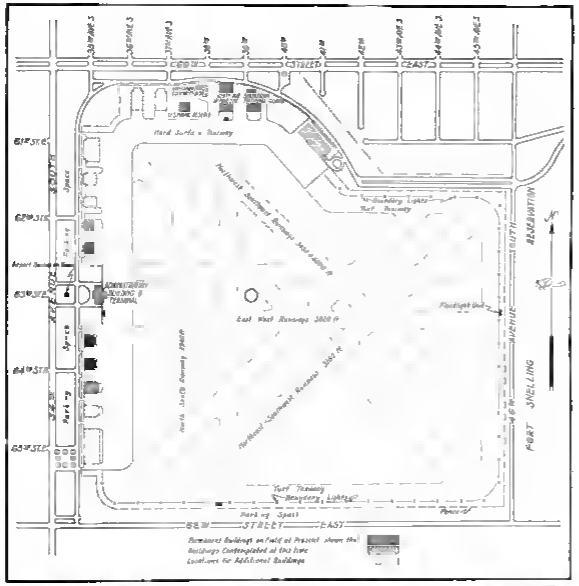
Transcontinental Air Transport officials have been conferring with local organizations on a proposed luncheon stop here on the new rail-and-air schedule which they plan to inaugurate by the first of May. Other companies, too, it is reported, have been considering making the Winslow Airport a point of call.

Development of Field At Agawam Is Started

HOLYOKE, MASS.—Fifteen tractors and about 70 men are now engaged in converting the tobacco field at Agawam into the airport being developed by Congressman Bowles and others.

Measured by actual flying capacity, this airport is claimed to be one of the most spacious in the country, because all the area will be given over to aviation. Its runways will range from 3 500 to 4 900 feet and its bituminous macadam takeoffs are to be 1,000 ft. long and 50 ft. wide. The first hangar is to be 200x120 ft. and the head-house with its signal tower 50 ft. high. A contract will be given soon for a giant beacon light. Plans for lighting the entire boundary and its surrounding driveway will be worked out. A port terminal will be built at the northeast corner, where the main entrance will be located, meanwhile the headhouse is providing temporary offices and passenger accommodations. Only 320 of the 350 acres now acquired will be needed for the development, and the intention is to have 150 acres ready by next July, when it is proposed to have the dedication. When improvements are completed, the field is not to have a grade exceeding 1 per cent grade in any part, according to plans. Full development will require two years.

Wold-Chamberlain Project



A diagram showing the proposed improvements planned at Wold-Chamberlain Field, Minneapolis, Minn. The ultimate completeness of the air base is indicated.

FOREIGN ACTIVITIES

France Approves Aero Importation

Air Minister Explains Necessity; Vote Budget for 1929 Program

PARIS, FRANCE—Contrary to previous policies, French air traffic lines will be encouraged during the coming year to give planes and engines of foreign construction a fair trial, according to M. Laurent Eynac, French Air Minister who, in his first address before the Chamber of Deputies since his appointment, pointed out the urgent necessity of use of modern aircraft by France and explained that neither construction nor performance of home-made craft had kept pace with that of other countries.

An appropriation of 1,821,000,000 francs (approximately $61,750,000) has been voted by the Chamber of Deputies in the session recently ended for the promotion of aviation during 1929. Of this amount 553 000 000 francs (or about $21,622 300) is to be devoted to commercial aviation and the remainder to military activities. No less than 120,000,000 francs are to be spent on development of new planes and engines.

To Extend Foreign Routes

Subsidies for next year to French traffic companies will total 170,000,000 francs, 65 000 000 francs being included for further development of the air route from Toulouse to Buenos Aires including its extension to Santiago. The subsidy further calls for improvements and extensions of air routes between Marseille and Algeria via Tunis, Marseille to Syria via Athens, Paris to Bagdad via Constantinople, and Paris to Malmo via Amsterdam. It furthermore includes establishment of air service between Paris and Madrid and exploration of air routes to French Indo-China and to Madagascar.

A national air university is to be established for training purposes, as well as a laboratory with experimental equipment for seaplanes and flying boats.

May Force Mergers

French aircraft works, numbering about 35, have not, up to the present, welcomed the Minister's desire for serial and standardized production by means of such voluntary mergers as would reduce the number to some 10 larger works but since these companies are subsidized by the Government more or less drastic measures may be expected from the Air Ministry in the direction of amalgamation.

Italian Traffic Doubled

MILAN, ITALY—Reporting an increase of about 100 per cent, Italian air transport services have carried about 20,000 passengers during the past year. An example of Italian activity is shown in the traffic of the Brindisi-Athens-Constantinople air line for August. 26,588 kilometers (16 685 mi.) were flown, 138 passengers transported, 4,984 kilograms (10 964 lbs.) of merchandise, baggage and mail transported. During the two years this line has been in operation it has had but one accident, and maintained a record of almost 100 per cent regularity.

Ocean Letter Service To Be Tried in Brazil

RIO DE JANEIRO, BRAZIL.—An ocean letter service which will consist of the picking up of radio messages from ocean liners outside home waters to their own ships and then delivering these messages in the form of letters to their fliers who will carry them to their destination is to be tried by the Compagnie Generale Aeropostale of this country. Such letters will be subject to the ordinary postal tax plus an additonal tax of about $.12 per five grams levied by the Brazilian post-office to make up for possible differences in postage.

The same company has been authorized to carry printed matter, samples and goods in its machines which ply in the Argentine and Uruguay services, charging the super tax of $.30 on 50 grams, or fraction.

Plan to Link Prague With London and Cluj

PRAGUE, CZECHOSLOVAKIA—Regular services between this city and England and Rumania will be inaugurated during 1929.

An air service to London has been under consideration several years but financial and political situations have hitherto rendered it impractical. It will be effected in the spring.

Since the construction of the landing field at Uzhorad in sub-Carthian Russia is nearing completion, the route from Prague via Brno, Bratislavia to Kosice will be extended to that place early in the spring.

Brazil to Ask Bids on Routes

RIO DE JANEIRO—A bill providing for invitational bidding on the establishment of six airlines connecting this city with all sections of the interior of Brazil has been approved by the Chamber of Deputies.

To Make Hankow Center of System

Commercial Aviation Network Will Reach All Parts of Republic

HANKOW, CHINA — Hankow, the "Pittsburgh of China" and former capital of the Nationalist Government, will be the focal point of a commercial aviation service which will connect it with all parts of the Chinese Republic.

Sponsored by the Provincial Government and local public organizations, the Commercial Aviation Co. Ltd. is being organized with an authorized capital of $5,000 000. Encouragement of the scheme, first proposed by the Wu-Han Commercial Aviation Association of Hankow, was expressed in the form of contributions from the promoters which include leaders in official and commercial circles. General Li Chung-jen, the head of the Hupeh Provincial Government contributed $50,000 to the company. The Provincial Government granted $10 000, while a similar amount was each contributed by the Bankers association, the Salt Guild, the Cotton Mills Union, the Public Utilities Company, the Exchange Merchants Guild, and the Chamber of Commerce.

The company proposes to establish air routes connecting Hankow with Peiping (Peking) in the north, Canton in the south Shanghai in the east and Chengtu in the west.

It is further reported that following the installation of the domestic service, an international one will be undertaken to link China by air with Japan, India, Russia, and Australia.

Swedish Air Service Expects Less Deficit

STOCKHOLM, SWEDEN—Reporting that its operating loss for 1928 will probably be less than that for 1927, the A.-B. Aerotransport is asking for a subvention of 750,000 crowns ($201 000) which will enable it to continue its services through the winter.

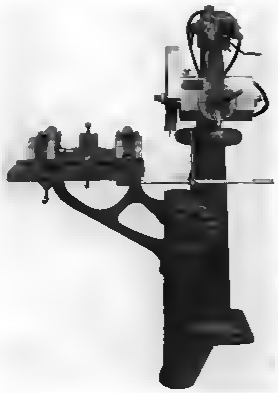
At the same time, the company is requesting $22 200 for the improvement of the Malmo airport. Some $13,000 of this would go toward illuminating the field, for which a floodlight and 15 smaller indicating lights are proposed, and $9,200 would be used to complete the radio station and hangar.

Aerotransport recently completed its second "round Sweden" tour, in which it carried more than 10,000 persons. A Junkers five passenger metal seaplane was used in the journey.

THE BUYER'S LOG BOOK

Bowlby Air Vise

THE COMBINATION of the Bowlby air vise with the DeWalt metal cutter was devised to produce a tool capable of handling and cutting steel tubing rapidly and efficiently. The vise is manufactured by the Bowlby Air Device Co., 1600 Fairview Avenue, Wichita, Kan.



A photograph showing the installation of the Bowlby air vise with the De Walt metal cutter

The saw itself is electrically driven by a five horse power motor and is fed into the work by a crank which also moves it back when the operation is completed. The circular blade used is made by the Atkins Saw Co. and was developed especially for handling aircraft tubing. It revolves at a speed of about 3000 r. p. m. The vise is an invention of V. S. Bowlby, foreman of the welding department of the Travel Air Manufacturing Co.

Equipment of the vise consists of a table and standard upon which are installed the pistons and jaw vises operated by air pressure of from 30 to 150 lb., and any pressure above 50 lb. will obtain satisfactory results for handling tubing up to ½ in. in thickness. If greater demands are required, larger jaws can be installed in five minutes.

The vise provides for forward, backward, vertical and horizontal adjustments so that it may be set to cut any desired angle. The jaws are so designed that they will accommodate not only round steel tubing, but square tubing and angle iron. The opening and closing of the vise is achieved by a slight pressure of the fingers upon a trigger which is easily accessible to the operator.

The cylinders are operated through a piston arrangement and compression rings are used to prevent waste of air. The cylinder and piston arrangements are finely machined and fitted with extreme precision. The complete installation occupies floor space not greater than 16 sq. ft. Cost of operation is less than $.30 a day.

Avigo Aviator's Watch

A WRIST watch specially dessgned for pilots is now being offered by the Elgin National Watch Co., Elgin, Ill. It is sturdily built but compact and dependable and will run 40 to 42 hr. on one winding.

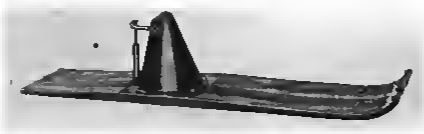
The "Avigo" strap watch is fitted with an extra long strap so that it can be worn outside of a flying suit. The dial is small in size and the important hours are numbered with heavy luminous markings.

Federal Ski

THE FEDERAL ski, manufactured by the Federal Aircraft Works, Inc., Minneapolis, Minn., is now available in many sizes. In this ski the supporting metal column is of conical construction and has an elliptic base. This construction affords the maximum strength with minimum resistance.

The column is placed to the rear of the bearing surface center of the ski thus giving it a natural tendency to climb when taxiing. The load is distributed by the use of ash runners tapering in thickness from the diameter. The bottom is sheathed with a metal covering additionally reinforced by metal runners.

To insure the proper alignment both in flight and on the ground the Federal rigger has been developed. This device is completely enclosed insuring continuous operation and eliminating the necessity of shock cords.



A side view of the Federal ski showing the cone shaped metal supporting column

The ski is of clean design and has a removable bottom. Its tapered construction provides even load distribution and maximum flexibility when encountering uneven surfaces. Its minimum side area insures directional control.

Tests conducted both in the Federal Aircraft Works and in the engineering laboratories of the University of Minnesota have shown that the ski structure possesses remarkable strength. To facilitate the handling of ships in hangars a simple trundling device is available.

Heil Truck Fueling Tank

INCLUDED IN the truck tank products of The Heil Company, Milwaukee, Wis., is an airplane refueling tank of 1,200 gal. capacity, oval shaped and having two equal compartments for carrying gasoline and a 2 in. Viking power pump, driven from power takeoff and located in rear compartment. The gasoline line from the end compartment, fitted with strainer and 1½ in. Badger meter and sight gauges, is also located in pump compartment with a 1½ in. Viking hand pump to be used as an emergency unit. Both pumps are capable of pumping into and out of each compartment from a single hose connection.

A 50 gal. auxiliary lubricating oil tank is placed on each running board of the truck. These tanks are discharged through a single Viking hand pump with a 1 in. Badger meter and strainer. This pump is also capable of pumping into and out of each tank from a single hose connection. The oil meter and pump also are located in the rear compartment. A 2 in. pipe allows the exhaust from the truck engine to pass through the tank to warm the oil in winter. The tank has dished heads, sills, galvanized pipe and chain railing.

The company also manufacturers underground and station storage air and pneumatic pressure tanks.

Recent Developments in Aircraft Armament

(Continued from page 35)

promise is made on such bombs between the chemical desirabilities and the high explosive requirements.

Bombs have also been designed with thick case for armor piercing and demolition effect after penetration. Tarficians do not appear to look upon this bomb with a great deal of favor at present.

Fuse equipment for bombs is usually constructed so that the bomb is carried safe until released. At release a small spinner is then set in rotation by the airstream, arming the fuse after a short distance of fall. While the bomb is in the airplane, this spinner is held from rotation by a wire, or pin with the bomb. In case it is desired to drop the bomb "safe," so that it will not explode, the spinner is held from rotation by a safety wire and the fuse does not harm.

Mechanical releasing mechanisms for bombs have been constantly under development, and keep step with the increased hfting and maneuvering characteristics of the airplane. In general, the development policy has been to install "internal" bomb racks in airplanes primarily designed for bombing, and "external" racks where bombing is a secondary consideration. This object has been accomplished except for the rack designed to carry the 2,000 lb. and the 4,000 lb. bombs. In this case, the rack is fastened to the lower portion of the fuselage, allowing the bomb to hang below and in the slipstream. An installation of this kind is shown in Fig. 5. One of the latest internal bomb racks is shown in Fig. 6a, operated mechanically and in such a manner that the lower bombs necessarily drop first and in predetermined sequence.

The releasing and safety handles vary considerably. A good example, however, is the one shown in Fig. 6b, used with the internal rack in Fig. 6a. It is generally thought that bombs, racked one above the other in a vertical plane, cause inaccuracies due to interference and possible rotation before leaving the fuselage, in comparison with such bombs released from a horizontal plane, and practically no chance of interference after release. The use of the vertical rack is mainly due to the necessary concentration of load and for structural purpose.

Fig. 8. A .50 caliber Browning aircraft machine gun

The sighting equipment for dropping bombs has been materially improved since the World War. One of the latest types used in the American Army is shown in Fig. 7. This is known as the D-4 bomb sight. The general theory of this sight is to obtain horizontal stabilization by a pendulum action dash pot mechanism for damping, direct the airplane on a straight line which will cause the bomb, when released, to strike in line with the target, and to release the bomb at the proper instant. When one considers that altitude, wind direction and speed of airplane, errors of equipment, lag due to personnel, and release mechanisms affect the proper time of release, bomb sight design appears to be quite complicated.

The airplane is directed on its course by the bomber using a synchronized indicator, or pilot director, operating directly and automatically from the sighting equipment. To correct for wind velocity, angle of approach, speed of target and the speed of bomber, it is a question of referring the angular velocity to a constant speed device. The difference in speed of the two elements controls a sight

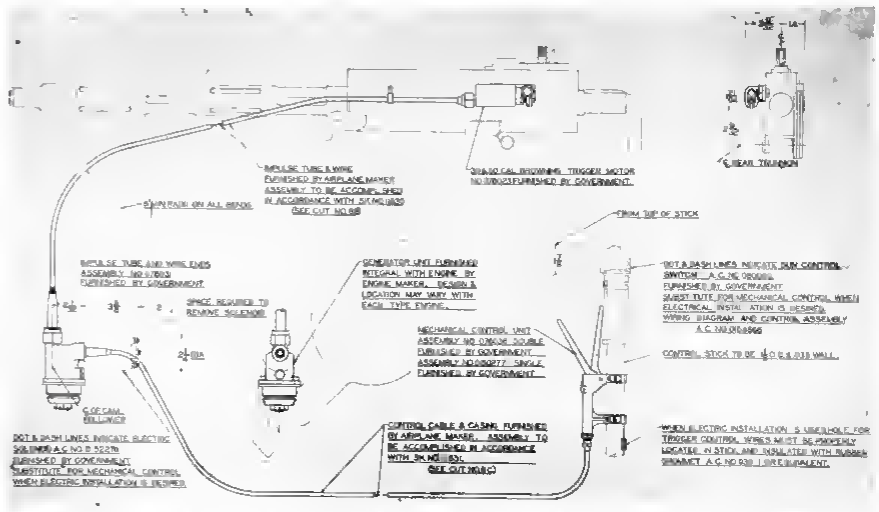


Fig. 12. Drawing showing the design and operation of a new type of aircraft machine gun synchronizing system.

reference point, which is in turn calibrated in such a manner as to give the proper corrections for the known ballistics of the bomb.

In the D-4 bomb sight, the constant speed device is an escapement mechanism similar to a clock. The velocity of angular travel is obtained by manipulating a hand crank. There is a hand adjustment for altitude and the variations of bomb ballistics due to the types and sizes of bombs concerned. There are several developments under consideration at present to improve this equipment from a mechanical standpoint, and better results may be expected in the future.

Pursuit developments have varied a great deal in the last 10 yrs. More speed, larger airplanes, and more power have brought out a larger caliber gun as a running mate for the old caliber .30 and a larger quantity of ammunition. The Ordnance Department has shown considerable interest and activity in the development of improved machine guns, bombs and pyrotechnics since the World War, and advancement has been made in the direction of greater efficiency, reliability and reduction of weight.

Fig. 8 shows the caliber .50 Browning aircraft machine gun. The rate of fire of the caliber .50 gun is approximately one half that of the caliber .30. The caliber .50 projectile weighs about one-fourth of a pound, and is approximately four times the weight of the caliber .30.

In Fig. 11 is shown a 37 mm automatic cannon for aircraft. The rate of fire of this weapon is about 150 rounds per min. with a projectile that weighs approximately one pound. Sensitive fuses have been developed for this ammunition, which will cause it to detonate on impact with airplane fabric. International agreements allow of high explosive projectiles for calibers above one inch, and at present interest has lagged in regard to mounting a weapon of this size on airplanes, and practically no development work is being carried out to build an airplane around such armament, although extensive use of similar weapons is contemplated for anti-aircraft use.

Fig. 11. A 37 mm automatic cannon for aircraft use.

In present operation of armament, the policy is to shoot the gun through the propeller disc without striking or damaging the propeller. In this connection, advancement has been made in such gears since the war. The speed of airplane and engines has increased to a marked degree. Pursuit planes are now dived with full throttle, the propeller attaining a speed of 3,000 r. p. m., or over. The synchronizing system must meet this condition of

high engine speed as well as low engine speed. The new gear that has given the greatest amount of promise is shown in Fig. 12. This system is the mechanical impulse type, giving positive impulses for firing by means of a rotating cam, synchronized with the propeller, a cam follower connected to the trigger motor on the gun by means of a wire, the wire being retained in a tube. The tube and wire may be bent in any direction without effecting synchronization. This allows considerable flexibility between gun mount and engine drive. The trigger control of this system has been designed to be operated either mechanically or electrically.

The pistol grip type with a control switch seems to offer the best means of handling both wing and synchronized electrically controlled guns. Also the electrical release bomb racks may be operated directly from

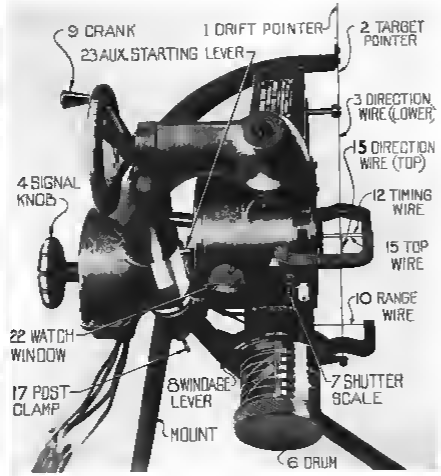


Fig. 7. One of the late designs in sighting equipment. This is known as a D-4 bomb sight.

this single trigger control. The selection of release, or type of gun to be fired, is obtained through a small selective switch on the dash board, having as many points of selection as desired for the various types of guns and release mechanisms.

The attack airplane, primarily designed for ground attack, presents new problems. The primary weapon of this plane is the fragmentation bomb. The method of attack is to fly as low as the topography of the country will allow, using all natural objects available, such as ravines, hills, woods, etc., to make the attack a complete surprise to the enemy. Machine guns are mounted on this type airplane to obtain a demoralizing fire on the objective, reducing counter attack measures to a minimum before delivering the fragmentation bomb for the finishing stroke.

At present, the attack planes are armed with one caliber 30 gun and one caliber 50 machine gun, synchronized, and two caliber 30 guns on the wings. This is a reduction of guns from past requirements, and future reduction of guns is contemplated, as it is clearly realized that speed and maneuverability are the fundamental requirements for safety at such low altitudes. Weight being the arch enemy of maneuverability and speed, there must

be a compromise for gun power. The secondary armament suffers in consequence.

In ground attack tactics, the tendency at present appears to be merging toward the pursuit school of tactics for discharging fragmentation bombs, namely searching out the target from high altitude, and diving to deliver the blow. All multiple seater military planes carry flexibly mounted guns for protection, or defensive action. There has been considerable discussion regarding multiple seater airplanes carrying flexible armament for offensive action against enemy aircraft, under the continual advancement of greater power and larger engines, with a natural sequence of larger airplanes and fuselages. The gulf between the maneuverability and speed of single seaters and two seaters is gradually lessening, until at present the difference is very slight. The rear gunner, if efficient and teamed well with his pilot, becomes a formidable power, and increases the gun efficiency of an airplane tremendously. This power, of course, is enhanced by seasoned, well trained gunners and proper equipment. The old merry-go-round of trying to get on each other's tail, would be eliminated. Some of the main drawbacks to the active and successful accomplishment of placing two seater fighters in our air defense, are, primarily, the difficulty of the rear gunner to handle himself and his guns while standing in the rear cockpit during maneuvers (this is a serious matter and can hardly be accomplished as long as the rear gunner is forced to stand in order to manipulate and fire the guns); the development of flexible sights that will allow of greater accuracy and longer ranges for striking the enemy, and third, the present pursuit school, who feel that the support of another gunner would jeopardize their offensive attitude, which compromised would offset the benefit gained.

It is believed that these points should bear serious consideration. The question of sights and mechanical handling is particularly serious. Little is being done on sights, but a gun mount is undergoing test which lends itself admirably to this type of work, as well as bombardment and observation. When mounted on the floor of a suitably designed cockpit, it gives complete protection from the slipstream for the gunner and gun throughout the more important angles of fire, eliminating from 50 to 75 lb. of weight from the conventional cockpit, and can easily be handled through 90 deg. vertical range of fire and 360 deg. horizontal, with the gunner remaining on the seat. In high speed, highly maneuverable planes, it is believed that the sitting position gives all angles of fire necessary for such offensive, or defensive work. This mount, properly installed, allows of considerable increase in size of cockpit as radio, signalling projectors, message chutes, etc. It greatly increases the vision when sitting.

Well Adopted for Turret Mounting

The mount is particularly well adapted for turret mounting on large fuselage planes where concentration of armament is sought. Concentration of armament is, of course, advantageous. When properly arranged, it affords greater possibilities for bearing more guns on a given point of attack; it affords the opportunity for quick interchange of gun personnel, or gun equipment, when such has gone out of action, and brings equipment and personnel into action, and makes it possible to maintain this status at the vital areas of attack without the knowledge of the enemy.

It is the writer's belief that armament is the truly military phase of aeronautics. The actual personnel allotted to carry on the development of this work is extremely small, the assistance from the commercial world is very small, and creative interest is needed.

Selling the Plane Market in 1929

(*Continued from page 32*)

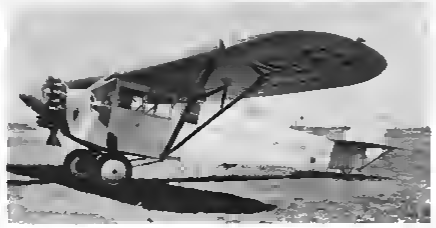
field He reads and studies the trade publications pertaining to the industry in which that product is manufactured, because in those trade publications he finds information of similar products, the activities of that industry within itself, and what other distributors or dealers are doing, etc

And in the case of the operator of trucks, motor buses, motorboats, airplanes, etc, he will read and study the trade publications also, and will notice advertising which he might pass over in any other kind of publication Then also, it has often been the case of where a private purchaser has consulted the trade publications before deciding upon the product to buy

Both Types Essential

It is earnestly requested at this point, that the above be not regarded as a plea for the cause of trade publication advertising Advertising in non-trade publications is just as essential and valuable to the manufacturer as trade publication advertising In fact, it backs up the efforts of the dealers in particular. It creates for them new prospects which eventually materialize as owners. However, sometimes manufacturers are inclined to doubt the value of trade advertising When they do that though they are considering individual sales instead of SALES VOLUME. And such an idea is all wrong!

The respective values of trade and non-trade advertising have been proved over and over again in other industries Each is effective and indispensable as regards national sales volume During 1928 there was a most noticeable increase of national non-trade publication advertising by aircraft manufacturers That is to be regarded as merchandising progress in the aeronautic field, and what is



A Fairchild Cabin Monoplane powered with a Wright "Whirlwind" J5 engine.

more, that type of advertising should, and will, be increased more as time goes on BUT, until the manufacturer has formed a smooth running national sales organization he should not sacrifice too much of his present trade advertising budget for non-trade advertising He should build up that end in keeping with the building up of his sales and service organization

Distributor and, particularly, dealer advertising is another matter The same rules do not apply Retail advertising placed where it will create the most retail sales would seem to be the best line of action And, incidentally, there are many, many advertising mediums besides periodicals for the manufacturer, distributor or dealer Some of the head liners are—radio talks, motion

pictures, booklets, fliers, souvenirs, window displays, placards, postcards, contests, etc But, it is the dealer who makes the retail sale, therefore his efforts should have, and must have, the backing and the cooperation of the manufacturer and distributor in such things as analyzing the territory, mapping out campaigns, selecting advertising mediums and, perhaps, as is often the case, a proportioning of the expenses. And, while we are on the subject of proportioning advertising expense, the manufacturer often times debits each distributor and dealer a certain amount for the cost of national advertising in which their names and addresses appear Thus the total cost is not borne entirely by the manufacturer alone, and all members of the selling organization derive a benefit

Eighth—by taking steps to assure a 100 per cent functioning of the service side of the business at all times Service to the customer is a convenience which is an absolute necessity. It is one of the greatest assets that a sales organization can possess, and upon it depends future sales volume For those mechanically inclined and possessed with the desire to be their own repairman, service is not so important, but, for those who are only interested in "having it go when they want it to go" and have no desire to know "why and how it goes" service is most essential in holding their good-will and creating resales This latter type of owner is in the majority in the automobile and motorboat field, and, although for the present forms the minority, is steadily increasing in number in the aeronautic field

In this age of "mechanical perfection" the purchaser of an automobile, for instance, demands and expects continued performance without his having to acquire a thorough knowledge of the workings of his purchase As an example, statistics inform us that about 75 per cent of automobile break-downs are due to ignition troubles, yet there is only about one car owner in five who even knows the name and type of ignition used on the engine of his car For that reason, automobile manufacturers (the successful ones) have established nation wide service organizations, as a part of their selling organizations or otherwise, to service their products and keep them serviced.

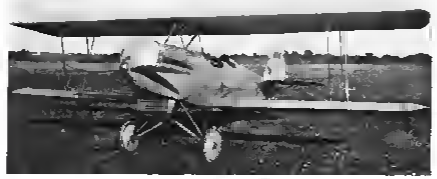
It is becoming the same story in the aeronautic industry. An airplane manufacturer has a "moral responsibility" for the performance of his product from the time it leaves

A Fokker Super Universal powered with a Pratt & Whitney "Wasp" engine

the factory until it passes into discard To fulfill that responsibility he must see to it that his distributors and dealers render service to the customer His supervision and assistance in this work is a form of cooperation that builds for more sales, and consequently more profits all down the line

Ninth—by giving the members of the sales organization an "even break." The aeronautic industry from the standpoint of retail sales volume is in its infancy. Everyone is "feeling" his way along To burden a distributor

with contracts well night impossible to fulfill will be but a boomerang. Give him a chance to get his feet planted, and help build for future sales as well as immediate sales. Naturally, it is desirable to the manufacturer that the distributor progress and continue to progress "tomorrow," and in view of the fact that, figuratively speaking, it is all new to him he will undoubtedly go a bit slow at first. Therefore, give him an even break and do not load him up with purchase contracts, or tie up all of his working capi-



An American Eagle powered with an OX-5 engine

tal in factory deposits. The risk works both ways. In short, as one well known manufacturer has so aptly stated . . . "It is not a question of . . . how many planes can you sell? . . . but . . . how many planes can we HELP you sell?"

Tenth, and last,—cooperate by REALLY cooperating!

In conclusion, it might be stated that the 1929 market can best be sold by the manufacturer devoting more time and thought to the building up of an efficient sales and service organization, than by concentrating on the matter of actual sales. The first will take care of the latter. There will be an even bigger market for plane sales in 1930 and thereafter. There will be an increasing number of flying schools, flying services, airlines, flying clubs, business organizations, and private individuals, etc., in the market for planes as time goes on. Prepare for that business while obtaining 1929 business. The best airplane in the world will not sell itself for long. It must be sold by organized effort! He who doubts that and operates otherwise will undoubtedly find himself among the "also rans" five years hence.

This is the first of a series of merchandising articles. The second will appear in an early issue of AVIATION.

A Review of 1928 Design Development

(Continued from page 28)

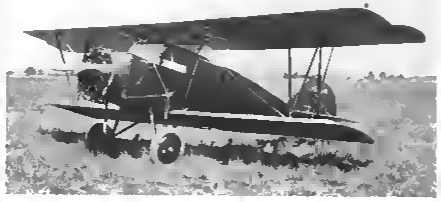
capacities of from four to six passengers and, with the exception of the Gates-Day Standard, are of the enclosed type. In interior finish they bear a striking resemblance to closed automobiles.

The new Fairchild 41, which falls in this group is a four place, folding wing type of conventional construction excepting the tail surface structure, which, like the Fairchild 21, is constructed of duralumin channel members covered with fabric. Ailerons and trailing edge flaps used in folding the wings also have duralumin structures. This plane is powered with the Wright J-5 engine and has a high speed of 130 m.p.h. and a landing speed of 49 m.p.h., according to the manufacturer. The wing span is 36 ft. the length 25 ft. and the gross weight 3,000 lb.

The largest of the three Fairchild planes is included in the 4,500 to 6,000 lb. gross group, and six of the planes in this class were displayed at the Chicago exposition. The Fairchild 71, is a seven passenger Wasp powered cabin

monoplane and embodies a number of refinements of the older Wasp powered Fairchild model Two new Stearman developments, the speed mail and light transport, designed for the Wright Cyclone engine, also are among the interesting airplanes of the past year in this group

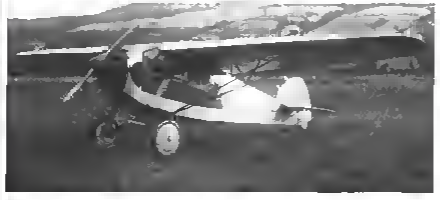
A number of the airplanes designed late in 1928 will be powered with the 300 hp "New Whirlwind Nine" engine, which is to be produced by the Wright Aeronautical



A front quarter view of the Warner powered "Cabinaire." This craft is representative of the new type of cabin biplane

Corp This is a result of the general demand for increased performance in the class of J-5 powered planes and at least two manufacturers have announced this intention They are the Mahoney-Ryan Aircraft Corp, which has brought out a new six place Ryan Brougham, and the Cessna Aircraft Corp, which is soon to begin production on a new six place cabin monoplane Two outstanding 1928 developments in the tri-engined transport plane class are the Wasp powered Fokker F-10-A and the Hornet powered Boeing Model 80 biplane

The most recent addition to the amphibian group is the Fokker F-11 flying yacht This craft is virtually a mono-plane with amphibian landing gear mounted in two lower wing stubs hinged to the side of the all metal hull The wing stubs also provide lateral stability while the craft is in the water The first model is of the pusher type pow-



The Warner powered Mercury "Kitten" which has a welded steel tube wing and fuselage structure

ered with a Pratt & Whitney Wasp engine mounted in a streamlined nacelle above the upper wing and suggesting in this feature the Savoia-Marchetti plane which established a distance record for Italy last Summer Future models will be powered by Wright Cyclone engines with Pratt & Whitney Hornets as alternative power plant The Fokker craft is characterized by its luxurious interior finish and provision is made for a galley and sleeping compartment in addition to the main salon and control compartment

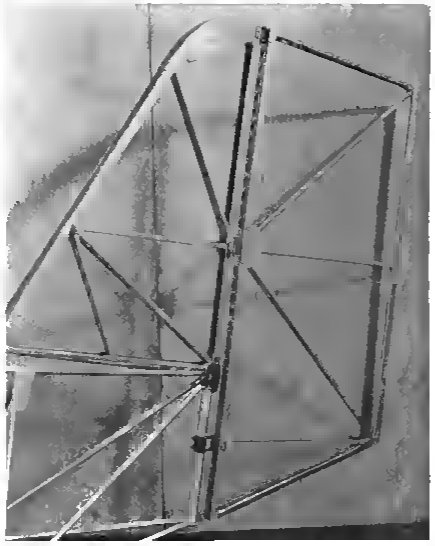
Engine developments completed in 1928 have been confined principally to power plants of the air cooled type and this is borne out by the fact that only one water cooled engine, the Curtiss "Conqueror," was exhibited at the

Chicago show Several new radial power plants have been developed during the year and attention is justly claimed by the three "New Whirlwind" models of the Wright Aeronautical Corp These engines are of the five, seven and nine cylinder types with almost all major parts interchangeable.

They are equipped with front exhaust manifolds and nose cowlings furnished as standard equipment by the manufacturer thereby simplifying installation by the airplane manufacturer. All accessories are grouped at the rear.

The Pratt & Whitney Geared Hornet is a new development in the radial air cooled engine group and it is probable that there will be more radial engines of the geared type in the future.

Among the other new radial engines are the Curtiss Challenger, Velie L-9 and Warner Scarab, which already have been described, and the more recent Brownbach



A view of the stamped "Alclad" tail structure assembly of the Fairchild 41 cabin monoplane

C-400, Hess "Warrior" and Kimball Model K The Hess and Kimball engines are of the seven cylinder, single row, radial type while the Brownbach is a six cylinder staggered radial These engines are all in the 100-135 hp class Another late engine development is the Szekely SR-5, a five cylinder, 65 hp aircooled radial having major units interchangeable with the Szekely SR-3.

It is interesting to note the tendency toward standardization of parts in the different models of several of the radial engine manufacturers This is also true of a number of the foreign power plants which are being manufactured here, or imported

An increasing number of engines of the 50-100 hp air cooled in line type was developed during the past year. Among these are the "Rover" designed by H E Morehouse for the Michigan Screw Co and the "Scorpion" manufactured by the Aeronautical Products Co Both are of the four cylinder type, the Rover being inverted

and developing 55-60 hp. The Scorpion is a vertical engine rated at 100 hp.

Despite the fact that only a limited number of engineering developments have materialized during the past year, much important work is now under way and conditions in this respect may be quite different at the close of 1929.

The Industry's Progress During 1928

(Continued from page 25)

ning aviation sections and have good aviation news. All of which favorably affects the future of aviation.

It is estimated that approximately 4,000 planes were built during 1928 which is an increase of some hundred per cent over 1927. This is below many of the estimates which were made at the beginning of the year but when the large increase in percentage is considered it is really very satisfactory. Had there been more reliable engines of under 200 hp. available there would undoubtedly have been more planes built and sold. Many engines of under 200 hp. were put on the market during 1928 and tried under working conditions. 1929 will see these engines manufactured on a quantity basis which will stimulate the sale of planes for training and for especially for private and sport use.

1928 saw a normal and very real improvement in the detail of design work, but little that was revolutionary. Probably the most important original development work done in this country was the work done by the N. A. C. A. on cowling for radial engines. If reports are to be believed, and if the application of the cowling can be put into practice, it should add very materially to the speed of planes powered with radial engines, and also stimulate the development of twin engined planes. Several old devices pertaining to the safety of aircraft have been vastly improved and appear to have been brought to the state of being practical. The Handley Paige automatic slot was brought over to this country and was tried out on several different types of aircraft. The autogiro made much progress and made cross country flights which would indicate that it had some practical value. Much work on wireless was carried on by the airlines, by private companies and by the government and it has reached a stage where its general adoption by the larger airlines is at least being contemplated.

A Most Favorable Outlook for 1929

In short, 1928 *has* been a year of great prosperity for the aeronautical industry. It has also been a year in which much was accomplished which will further the growth of the industry. The new financing which has been done makes possible a great expansion of manufacturing facilities. The growth of the air mail and the beginning of passenger carrying on regular schedule and along sound lines gives promise of continued prosperity and growth. The large increase in the number of airports will make possible the building and use of more aircraft. Technical improvement and the bettering of the flying qualities of planes have improved at a satisfactory rate and this, added to the new engines available, should increase the demand for planes. The flying club movement is growing and certainly there is every indication that there are constantly more people who want to fly either for sport purpose, or for business reasons. There is, therefore, every reason to believe that 1929 will be a year of continued growth and prosperity for the industry as a whole.

SIDE SLIPS

By ROBERT R. OSBORN

OUR OWN ADVICE TO THE LOVELORN

* * *

Following the example of many prominent magazines and newspapers which have columns of advice, mostly for the lovelorn, conducted by all-wise clergymen or sophisticated ladies AVIATION has decided to inaugurate such a service for its readers through the Side Slips column. Unfortunately the answers to readers questions cannot be given by either a clergyman or sophisticated lady, but this columnist wishes to state that he has been around a bit and knows a few things and is prepared to give *an* answer to any question he wishes to answer. Below are given the answers to a few of the many pathetic appeals we found in our mail after the holidays.

* * *

Dear Sir:

Having read about it so often in the newspapers I decided it would be very romantic to propose to my girl while we were flying. To my great surprise she said, "No." As far as I know this has never happened before and I was unprepared for the emergency. What should I have done or what can I do?

Disappointed Pilot.

Ans.—You should have charged her for the flight. As you didn't inclose your picture we can't be sure why she said, "No," however, you might wait for some really cold weather and try her again, while wearing a face mask.

* * *

Dear Sir:

I'm an old time pilot and can recall not so very long ago when any aviator was the best possible answer to a maiden's prayer. Now I can strut around all day without even a flicker of a feminine eye-lid, while they all flock around my dumb students. A fine state of affairs I say, but what can we do about it?

Early Bird.

Ans.—It certainly is a sad state we've come to. Nowadays they don't care how well a man can fly, all he needs is the uniform and a good line of talk. You might try outfitting yourself with a flossy new leather coat, riding boots, whipcord breeches, and the biggest pair of gold wings you can get,—and always wear your helmet and goggles,—night and day. Try yeast and Murads too.

* * *

Dear Sir:

I'm a young college graduate and have decided to make aviation my profession. I'd like a position flying the night mail as that would leave my afternoons free for golf. Please tell me where to apply.

Aviation Enthusiast.

Ans.—Glad you are entering aeronautics as we've always claimed there should be a college graduate in this business. You had better join the First Pursuit Group or the three "Sea Hawks" to get a little experience before applying for the mail job.

* * *

Dear Sir:

I'm a girl over 25 and not very beautiful, I'm afraid. Do you think that if I learned to fly it might help me to be popular?

Lonesome.

Ans.—No, that doesn't seem to work any more. Better spend your money on the saxophone or parlor tricks.

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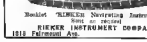

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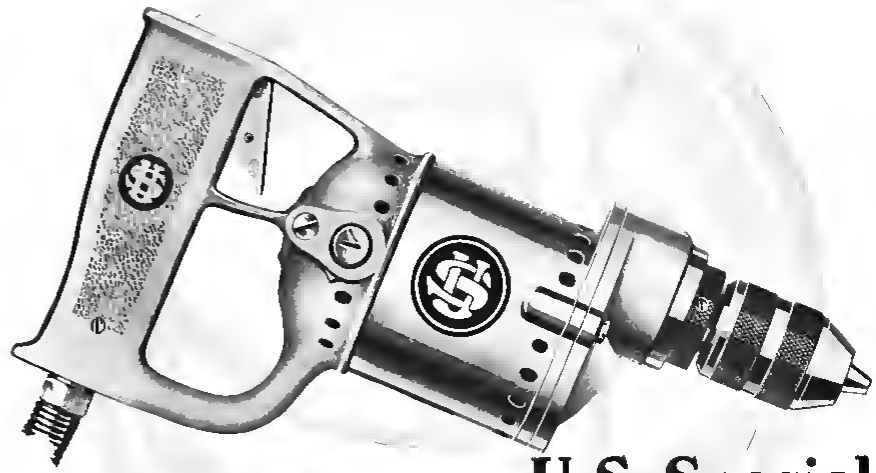

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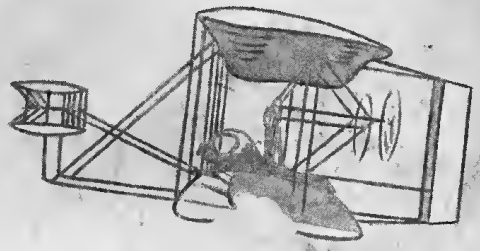

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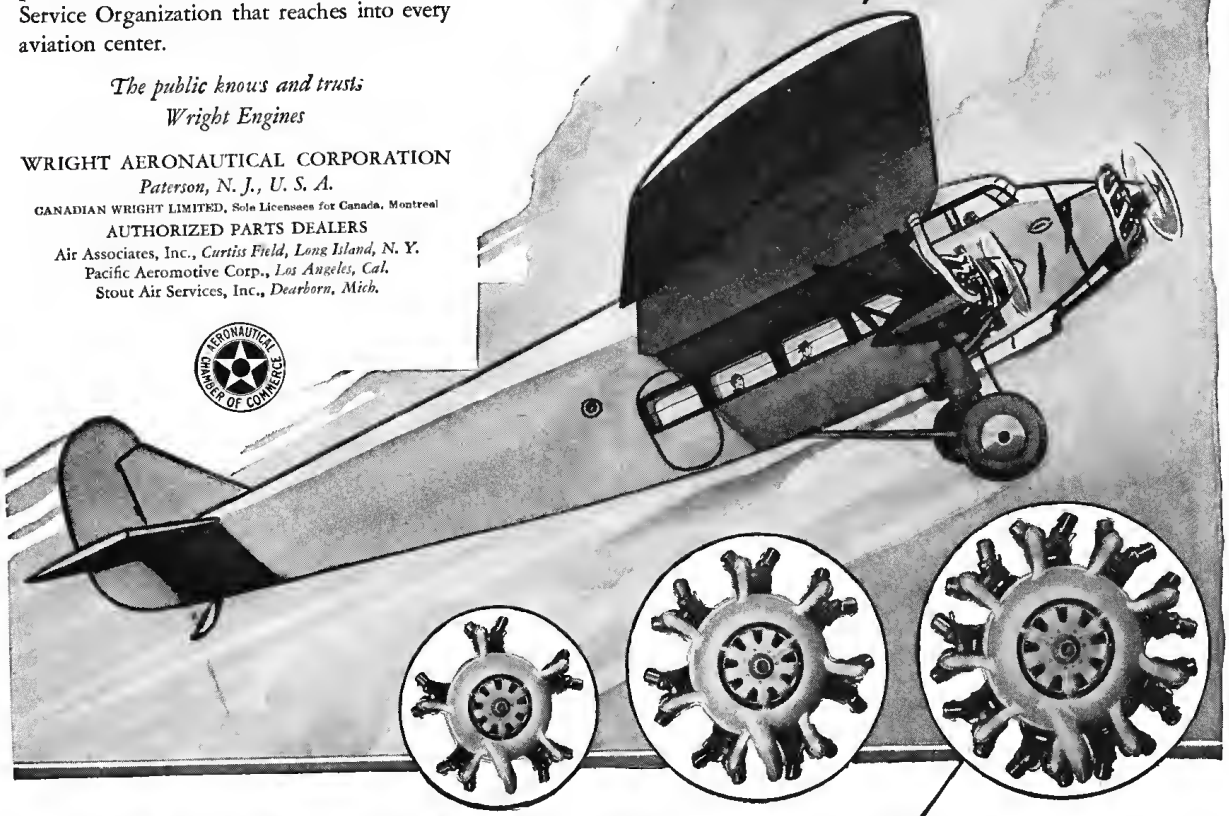

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